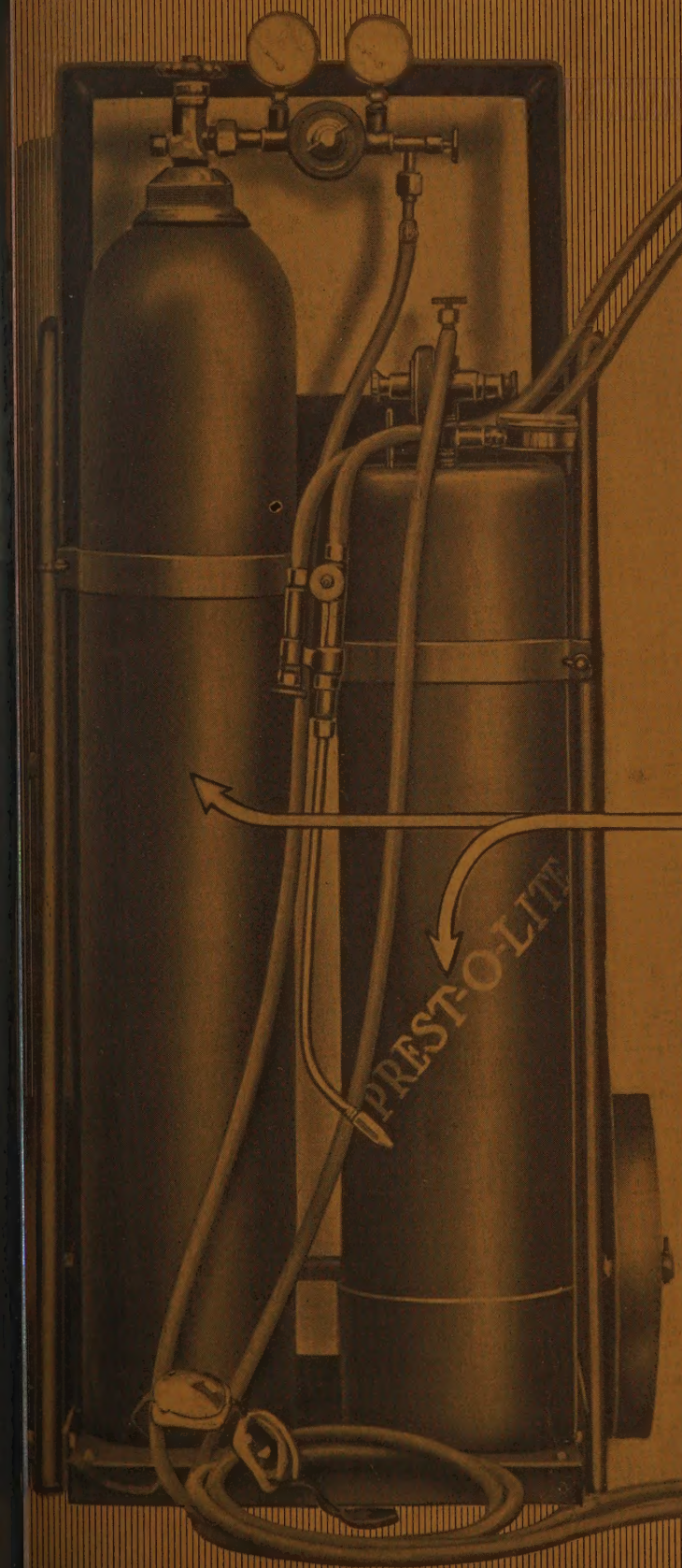
ELECTRIC RAILWAY JOURNAL

Volume 44 Number 19 McGraw Publishing Co., Inc. New York, Nov. 7, 1914



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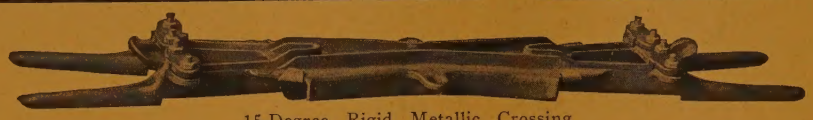

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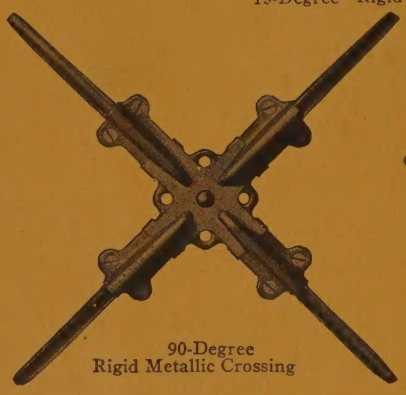

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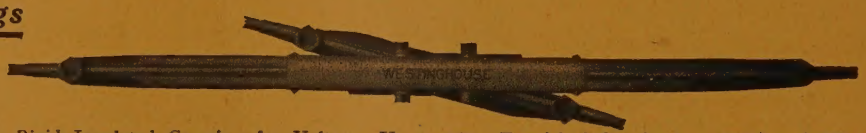

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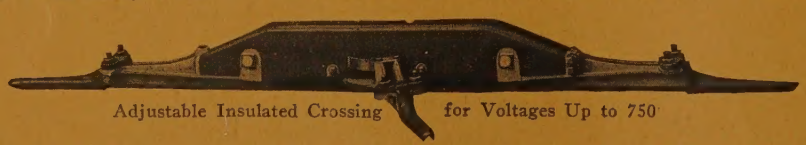

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Electric Railway Journal

New York, November 7, 1914

Volume XLIV No. 19

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Electric Railway Service in Manila 1042

Historical, operating and engineering features of the electric railway properties in a large Oriental city. Many difficulties overcome in the construction of the railways.

Electric Railway Journal, Nov. 7, 1914. 8½ cols. Ill.

The Code of Principles 1047

Why the code was prepared. How it should be used. Brief discussion of each principle by Thomas N. McCarter, chairman of the Public Relations Committee, which drafted the code.

Electric Railway Journal, Nov. 7, 1914. 4½ cols.

Electrical Operation on the B., A. & P. Ry. 1050

J. B. Cox tells how the electrification of this ore handling line has resulted in greater operating efficiency and in a saving of more than 20 per cent in operating cost.

Electric Railway Journal, Nov. 7, 1914. 4 cols.

The Bow Trolley on the Indianapolis & Cincinnati Traction Company's Lines 1052

The bow trolley, which is widely used in Europe, has received very little consideration in this country, but its ability to reduce arcing has proved very satisfactory on this interurban railway.

Electric Railway Journal, Nov. 7, 1914. 5¼ cols. Ill.

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Electric Railway Journal, Nov. 7, 1914. 4½ cols.

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James H. McGraw, President. J. T. De Mott, Treasurer. H. W. Blake, Editor.

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Milwaukee

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Electric Railway Journal

New York, November 14, 1914

Volume XLIV No. 20

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Renewing Rail on Twelve-Year-Old Ties and Foundations 1088

An interesting piece of track rehabilitation on one of the Detroit United Railway's principal trunk lines. In this article the character of the work and the facilities for doing it are described.

ELECTRIC RAILWAY JOURNAL, Nov. 14, 1914. 8 cols. Ill.

Corrosion of Metals in Natural Soils 1092

E. H. Scofield and L. S. Stenger show that electrolytic corrosion can and does occur without stray railway currents and that two sets of conditions may cause it. Experimental data are given to prove the contentions.

ELECTRIC RAILWAY JOURNAL, Nov. 14, 1914. 7 cols. Ill.

National Civic Federation Draft Bill 1096

Abstract of main features of bill drafted by executive council of the department on regulation of interstate and municipal utilities of the National Civic Federation, together with representative suggestions for amendment of the bill. Also memorandum of transmission by Seth Low and William R. Willcox and the dissenting report by E. M. Bassett, John H. Gray and Milo R. Maltbie.

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American Association News 1103

Opening of the new association year is marked by many committee meetings. Engineering and Transportation & Traffic Associations have selected subjects which will be announced soon. Index bureau subscription is in danger.

ELECTRIC RAILWAY JOURNAL, Nov. 14, 1914. 3 cols.

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JAMES H. MCGRAW, President. J. T. DE MOTT, Treasurer. H. W. BLAKE, Editor.

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Electric Railway Journal

Published by the McGraw Publishing Company, Inc.

Consolidation of Street Railway Journal and Electric Railway Review

Vol. XLIV NEW YORK, SATURDAY, NOVEMBER 7, 1914 No. 19

HIGHER VOLTAGE DIRECT CURRENT

The abstract of the Institute paper on the Butte, Anaconda & Pacific electrification which appears elsewhere in this issue is a most encouraging statement for electrical operation, the reported profit of 20 per cent on the initial cost that was effected through savings over the cost of steam operation being enough to deserve the attention of any railroad management. The statements regarding the negligible effects experienced in service with flash-overs at the high potential of 2400 volts are especially interesting, because this has been a point subject to considerable discussion in the past. In view of the satisfactory results obtained from this step another material increase in d.c. voltage may be expected in the near future. Of course, the proposed installation on the Chicago, Milwaukee & Puget Sound Railroad with 3000 volts constitutes an actual step ahead, but so much has been heard of the practical possibilities and experimental installations of d.c. equipment at voltages far in excess of this that it seems not unreasonable to expect, in the near future, some d.c. installations at 5000 volts or even more, especially in situations where the motor is not restricted in size. This prospect, together with that of the practically accomplished development of the mercury-arc rectifier for railway service, constitute possibilities in the art of electrification of steam railroads that were almost undreamed of when it first began on a large scale ten years ago.

ENCOURAGING RATE DECISION

Elsewhere in this issue is printed an extended abstract of one of the most important rate decisions that have lately been handed down on the subject of electric railway fares. In granting a substantial increase in rates to the Middlesex & Boston Street Railway, the Massachusetts Public Service Commission has done far more than to approve measures of financial relief to a deserving company. It has enunciated most significantly its belief that the future of private ownership under public regulation depends upon a living wage to capital no less than to labor. Its unequivocal stand upon this question, as well as the clarity of its findings, the soundness of its methods in dealing with the evidence before it and its constant alertness in drawing conclusions of general application from the material assembled, will interest the student of rate-making from start to finish. The Middlesex & Boston Street Railway, operating many miles of thinly-populated country lines in addition to suburban lines in Newton & Waltham, has been struggling to earn a bare 4.35 per cent on its investment, unable adequately to care for depreciation but forced to pay relatively high rates for borrowed money, to satisfy the public's demands on high-class service and to meet rising costs of material and an arbitrated wage increase. On account of these conditions the company asked for a 6-cent fare on the entire system and an additional charge of 1 cent per transfer, which would add $110,000 to the company's annual revenues. The commission approved only the former request, with the provision that the company sell nine tickets for 50 cents on those portions of its system where a 5-cent fare now prevails, and give free transfers at all existing transfer points. The granted increase is estimated by the board to yield the company about $70,000 per year. This, the commission says, should enable the company to maintain its property in safe condition by expending for maintenance and revenues, until some general basis for dealing with depreciation is ordered or indicated by the board, substantially 20 per cent of its gross revenue, and also to provide very moderate dividends.

IMPORTANT QUESTIONS DECIDED

This Middlesex and Boston opinion discusses a number of important questions which may only briefly be indicated here. The right of the commission to deal broadly with the company's fare problem, regardless of prior franchise agreements concerning fares on its constituent lines, is admirably set forth. In the light of previous court decisions this was not unexpected, but it is wholesome for the powers of the board thus to be brought prominently and clearly before the public. The reckoning of the return upon the basis of capital investment instead of upon reproduction cost is also significant. The commission does not concede for a moment that money lost during the earlier stages of a public service enterprise soundly and honestly managed should be irretrievably gone from the stockholders. In its opinion, public utilities are never finished, and unless they are kept on good trading terms with the public the whole experiment of private ownership under public regulation must fail. Then, too, the commission feels that the more prosperous lines should, to a large extent, pay the losses on the less patronized routes. It is not unreasonable, it is said, to suppose that some advance over the original fares might now be necessary even upon the better-paying lines if these had continued to be separately operated. These various changes and others allowed by the commission are anticipated to

produce the minimum hardship upon the communities served, and their working out will be of considerable interest. Welcome as would have been a complete granting of the company's petition, the foregoing points sufficiently show the desire of the commission to protect electric railway investors, and it is a splendid thing for the whole policy of private ownership under public regulation to have a state commission standing as high as that of Massachusetts take such an unmistakable stand. Unless all signs fail, too, the public will cheerfully meet the situation in this fuller recognition of the rights of the electric railway investor. As the opinion of the commission will have a wide circulation, it should be a help to managers of properties far and wide who may be confronted with the question of giving service for less than cost.

ELECTRIC RAILWAYS IN AND ABOUT MANILA

A remarkable illustration of efficient service performed by an Oriental street railway system in the face of a number of singular operating problems is shown by the account of electric railway operation in Manila, published elsewhere in this issue. The success of this pioneer traffic system which has enabled it to give good service can be attributed largely to the development of the Philippine Islands under the American administration.

The street railway and lighting property in Manila, which received its franchise in 1903, two years after the inception of the American regime, has developed with the city. The replacement of lax Spanish educational methods by a modern system or elementary schools, the improvement of the harbor of Manila and the establishment of bureaus of forestry, health, agriculture and constabulary, all contributed to the furtherance of more peaceful civil relations and to the enlargement of the Filipino's producing power. Increased production stimulated important commercial relations with America, which, with the large increase in tourist travel have been responsible for the rapid growth of Manila and, incidentally, of its traffic system. In its turn the street railway company has reciprocated by providing better service through the expenditure of a large portion of its net earnings for extensions and for new power and car equipment.

A successful struggle has been conducted by the resourceful street railway officials of Manila in protecting their equipment against the natural eccentricities of the Philippine climate, such as torrential rains and the ravages of white ants in devouring wood. Other questions, such as the low per-capita wealth of the city served, present difficulties which can be eradicated only with time. The results obtained by the company in maintaining in the face of these physical and economic obstacles a standard of service unexcelled by the street railway system of the neighboring more densely populated cities of Tokyo, Yokohama and Shanghai in point of promptness, reliability, area served and completeness of equipment should serve as an example of accomplishment to other more highly-favored roads.

INSERT FASTENINGS IN SPECIAL WORK

Our study of insert special work failures and the opinions of engineers expressed in the communications which have followed its publication clearly emphasize that the renewable insert is far superior to the non-renewable insert and that in its setting and fastening, simplicity and accessibility are the most important features. Under heavy traffic most of the plates with any type of insert fastening will come loose at some time during their wear life. Hence, the most desirable fastenings and settings are those which will reduce this number to a minimum, eliminate complications in the rest of the track structure after they do become loose and permit replacements or repairs to be made by the average track laborer. Other important features are provision in the setting to overcome the side thrust of canted trucks and sufficient weight in the insert plate to prevent the peening or cold-rolling action from shearing off or stretching the bolts.

In the past some engineers have demanded fastenings which were too easily released under traffic vibration. Others, going to the opposite extreme, have specified fastenings which practically require the removal of the frog or crossing when refastening or renewal is necessary. While the latter fastening has reduced the number of loose inserts to some extent, it manifestly entails considerable expense when repairs are necessary and may obstruct traffic if the entire piece must be removed. But on light-traffic lines such a fastening has proved very satisfactory and loose inserts are rarely found.

In our insert special work articles we expressed the belief that the setting necessary to meet modern heavy traffic conditions and reduce to a minimum the complications following the loosening of an insert should be the completely or partially-machined bearing type. The approval with which this opinion has been received in the communications sent to us is most gratifying. Obviously a setting which will permit the average track laborer to place an insert in its correct position should prove most satisfactory. It is also believed that a machined-fit, mitered joint between the insert plate running rails and the arms will further assist in obtaining a secure initial setting. It will make the resetting more positive and unquestionably will reduce impact at these points as well as eliminate the tendency of the plate to tilt.

Larger plates with gentle approaches to the narrow throatways, or plates set in special work with the throatways through the arms gently leading up to the narrow throatways in the plate, will gradually right canted trucks and thereby eliminate side thrust. The use of a welder in iron-bound work or provision in the mold of steel-bound work will supply this remedy. This also applies to the method of building up the throatway floor in the rail arm so as to provide a gentle approach to a flange, or equal flange and tread bearing in the insert.

If all of these precautions are taken in the manufacture of track special work, they will have a tendency

to reduce materially the number of loose inserts and thus greatly prolong the average life of insert special work.

A WAR STRICKEN CONTRACT

As our readers may know, the London, Brighton & South Coast Railway is undertaking a large work of electrification, including all its suburban lines, and as a whole about 120 miles of lines are to be converted, a task which was expected to cover some four years. Work is already under way and now comes the war to interfere seriously with the original program. As it happens the cable was of Belgian make, and it is not yet clear how much of the material has already been shipped. The cable making was under way a year ago, but of course the works are now closed by the war, and even if not destroyed in the progress of hostilities it may yet be a long time before the supply can be obtained from this source. It is quite certain, however, that the cables can readily be made in England if the strain of the war in the matter of workmen does not become too severe. At all events the American, Italian and Swiss factories could fill the demand, so that this part of the work will not be seriously interfered with.

The general contractors for the equipment, however, ordered the motors and controllers from the Allgemeine Elektricitäts Gesellschaft of Berlin. Nobody can guess intelligently how long the war is going to continue, but, whether long or short, it is quite certain that no British money will go to German manufacturers for a very long time to come. The general contractors will certainly have to cancel their German agreement even if they have not already done so.

In the class of apparatus required for this contract there are relatively few makers having facilities and experience enough to turn out a first-class product promptly. The American makers can meet all the requirements either through their factories here or through the allied British companies. The only other neutral sources where such apparatus could be obtained are in Switzerland, whence egress is troublesome. Moreover, the two great Swiss electrical works are situated dangerously near the German frontier and are somewhat crippled as to labor conditions by the Swiss mobilization. Whether Switzerland can actually keep out of the war remains to be seen. It seems evident, therefore, that the American makers, either directly or through their British establishments, are in line to get this important work, and it goes without saying that the contract in their hands would be filled well and promptly.

This is only one example of the necessary work of the world that is headed this way. When the returns are all in it will probably be found that there are many other German contracts scattered over the world which must be turned over to neutrals, and the aggregate amount of work thus coming to the United States ought to be very considerable, since customers cannot be expected to wait the outcome of an indeterminate and paralyzing struggle like the present one.

POLITICS AND PETITIONS TO COMMISSIONS

One of the most trying duties of the conscientious railway officer is the effort to combat an appeal made to a state commission for political purposes. An operating man can always tell whether petitions for altered service, reduced fares or extended transfer privileges arise out of a genuine local desire for the modification of existing conditions or whether the cause is an attempt on the part of someone to advance his political prospects. But in most cases the adjudicating tribunal is obliged to go through the proceedings just the same, and the burden upon the companies in the weeks prior to municipal and state elections is sometimes most exasperating.

No gain whatever comes from allowing a feeling of irritation at such often needless proceedings to manifest itself on the part of the company, and where cases of this kind reach the public hearing stage, the only thing to do is to marshal the facts, figures and deductions with the same care that would be brought about by an inquiry directed by the commission itself. Fortunately it is seldom a difficult problem in transportation technique to "call the bluff" of the politician who is trying to use the company merely as a pretext for his own selfish ends, and a commission composed of men of insight is not easily deceived as to the motive behind petitions. The chief burden of such proceedings is twofold. They tend to stimulate agitation against the company in various neighborhoods influenced by the politician in charge of the movement, and they add to the existing heavy cares of the operating man and take up his valuable time.

Agitation fostered by self-seekers must be faced with entire frankness, and an open attitude on the part of the company with respect to the reasons for its methods of operation in various localities is the best safeguard against political attack. The public hearing is often a sort of safety valve, at which considerable steam can be let off harmlessly. But after this is done all the pressure against the company will be apt to disappear in the face of facts and man-to-man explanations of service and fare difficulties and the efforts being made by the company to solve them. Where little ground exists for complaint, the occasion may be turned to real account along the line of better acquainting the public with real conditions. There is no relief from the necessity of doing this. It is a part of modern public service, and only by training competent subordinate officials to represent the company in such proceedings can the higher executives of a road be spared some of these burdens.

Commissions are more and more seeing the benefits of informally adjusting complaints through conferences with the interested parties, and the proportion of this class of procedure to the number of formal petitions handled is likely to increase as time goes on. The new Maine public utilities commission act provides that the board may investigate rates or service, "being satisfied that the petitioners are responsible and that a hearing is expedient," and this provision is decidedly in the interest of eliminating lengthy procedure with respect to

doubtful appeals of questionable ancestry. If managers make the best of the situation, we are disposed to believe that the commissions will more and more endeavor to protect their dockets against political exploitation.

MORE ABOUT THE CODE OF PRINCIPLES

In last week's issue we suggested the necessity for study of the principles formulated in the code adopted at Atlantic City. To assist our readers in this study a statement has been secured from Thomas N. McCarter, who was chairman of the committee on public relations of the association during the formulation of the code by that committee. Mr. McCarter states some of the ideas which should be suggested by the code of principles or, to use a somewhat technical word, he suggests the proper connotation of the principles. It is not so much what the principles say as what they signify to the rank and file of the industry that will make them effective. The statements made by Mr. McCarter are intended to be merely suggestive. We hope that they will provoke lively discussion.

The code as a whole outlines the big problems of the electric railway industry to-day. Without disparagement to the engineering department which supplies necessary motive power, the equipment department which gives us good cars and maintains them, the transportation department which supplies the human element and keeps it in good training and humor, the accounting department which adds up the nickels and distributes expenses in accordance with the standard classification, and the claims department which insures equitable settlement of accident cases, their problems are less difficult than that of the management which deals with the fickle and inconsistent public. The reason for this is that the departments named deal largely with material and technical matters which follow certain fixed and ascertainable laws. We do not forget that the uncertain human element enters into the work of all of these departments, too, and to that extent complicates their work. But think, in comparison, of the task of defending a property against opposition which possesses the power to confiscate the equity in it and which is apt to be dominated by the ignorant demagogue who achieves cheap notoriety by railing at vested interests!

The electric railways believe that they will get fair treatment from an intelligent and informed public; they fear only ignorance and graft. As we pointed out last week the average citizen does not seem to be able to distinguish between capital and affluence. He puts a railway capitalized at a million dollars in the same class as a millionaire capitalist, and forgets that the capitalization is borrowed money for the use of which regular payments are demanded by the owners. There must come a different point of view before permanent improvement is possible, because the public service commissions can only reflect public sentiment after all. The industry has a big educational job ahead, and it devolves upon the incoming committee on public relations to carry on the work, which so far has resulted in the completion and adoption of the code of principles.

THE FORERUNNER OF TRADE

In a number of recent issues of this paper we have had occasion to comment briefly upon the close sequence between investment and trade which has always been exhibited in the history of the world's commerce. This point is emphasized again by the interesting discussion of European tramway investments by W. J. Clark, published elsewhere in this issue. Up to this time the citizens of this country have been contented largely to look within their own borders for their electric railway investments. The only exceptions of tramway enterprises controlled by American capital, outside of this continent and the United States insular possessions, which we now recall, are a few in South America and in the West India Islands. But the conditions are very different abroad, and before the war London, Brussels and Paris were the centers of electric railway holding companies operating properties not only throughout Europe but the world over.

We are referring to this fact at the present time because it is so closely associated with the South American trade of which so much has been said recently. Our country has never had its logical share of the commerce of South America. It has perhaps been logical that our country, being itself a debtor nation, has been content to devote its enormous resources to domestic enterprises, supplementing them from time to time with foreign capital. The result has been, however, that our manufacturers last year sold to South America only about 12 per cent of her imports and only 6 per cent of our exports, and these percentages were devoted mostly to articles in which we as a nation possessed special advantages.

On the whole, our capital investments in South America have been absurdly small as compared to those of European capitalists. Great Britain and Germany, the commercial powers of Europe, have not only had money for South American investment but have been willing to take a lower interest rate than seems popular here. British capitalists have gone into South America in groups with immense corporate funds for extended investments, while the Germans with less capital have through the establishment of agencies and a diligent study of the South American people and methods carried on their invasion more through a perfecting of trade channels. According to Sir George Paish, formerly the editor of the London *Statist* but now in this country representing the English Exchequer, the total investment of Great Britain in South American countries is as follows: Argentina, $1,600,000,000; Brazil, $739,000,000; Chile, $305,715,000; Peru, $170,865,000, and the other countries, $180,620,000. That these sums have not resulted entirely from operations in the distant past is shown by the fact that during 1913 the investments of Great Britain in these countries amounted to: Argentina, $93,205,000; Brazil, $104,350,000; Chile, $12,920,000; Peru, $4,500,000, and the other countries, $7,195,000. The effect of these investments may be realized when it is considered that in Argentina Great Britain has more than twice the trade

of her nearest competitor, Germany, and for all South American countries combined Great Britain far surpasses any other nation.

Vast as the above investments have been, there is still room for additional capital in South America. John Barrett, director of the Pan-American Union in Washington, D. C., believes that the United States can profitably invest $7,000,000,000 in South America within the next twenty years. Colombia with its need of money to build railroads, open mines and market lumber can well utilize $25,000,000 in the next ten years, while Brazil and Argentina should each have $100,000,000 in the near future. There are certainly real opportunities in these and other southern countries for Americans interested in making loans and investments, and creating those conditions of prosperous development which are the forerunner of trade and which lead the beneficiaries naturally to turn for advice and commerce to the nation whose helping hands have thus been outstretched. The sooner our banks realize that investment of American capital in legitimate South American development is the surest way to bind our sister republics to us, the more quickly will we secure that expansion of trade now so strongly desired. The only South American country in which American capital is at all well represented is Brazil, and in 1912 American electrical exports to this country predominated. When this is considered in connection with British investment and trade supremacy in Argentina, the inference is plain.

THE CASE OF THE RAILROADS

The war events still occupy practically all of the first pages of our metropolitan dailies as well as most of the second and third pages, so that between war news and politics little space is left for accounts of current events of importance which are happening in this country. There is no doubt that the present war is a catastrophe to the human race. Its tremendous losses are almost if not quite too great to be comprehended. We intend in no way to depreciate the seriousness of the conditions abroad, but the war should not blind up to serious conditions in this country. In fact, judged purely from the standpoint of money involved, there are certain matters at stake in this country which compare in importance with the stupendous amounts involved in the destruction going on in Europe.

Articles have appeared in some of the foreign papers and have been copied in the American papers estimating the amount of financial injury which has been suffered by Belgium and some of the other contending countries, and speculating upon the sum which the Allies, if successful, will force Germany to pay at the close of the war as reimbursement for the losses inflicted. Is it to be the five milliards of francs, or the $1,000,000,000, which Germany demanded of France at the close of the Franco-Prussian war, or is it to be two times, or five times, or ten times this amount? This is necessarily a question of the future, but a hearing has been going on in Washington during the past few weeks which has involved property worth not merely $1,000,000,000 but more than twenty times that amount, yet it has attracted comparatively little public attention.

We refer, of course, to the hearing before the Interstate Commerce Commission which involves directly the investment in the steam railroads of the country, which has been conservatively estimated at $20,000,000,000, and only less directly the investment in the electric roads, which has been estimated at from $3,000,000,000 to $4,000,000,000, as well as that in the manufacturing industries which depend for their prosperity upon the supply of material to both of these classes of roads. We include the electric roads because while their interests are not as closely bound up in the rate hearing at Washington as are those of the steam roads, yet favorable action there and a clear-cut statement on the part of the commission of the needs of the steam roads would undoubtedly give moral support to the demands of the electric roads on the state commissions and municipal authorities for fairer treatment.

Both classes of railroads have explained their needs to the public and to the properly constituted authorities. With both the present situation has been brought about largely by the same causes—the higher cost of materials and labor and higher taxes. With both the conditions arising largely from the war have involved the necessity of paying higher interest rates in the future. With both the question of an advance of rates is not one which can be postponed indefinitely. In the steam railroad field, for instance, the companies are facing the necessity of providing some method of refunding their short-time notes, debentures and other bonds which have an early maturity. It has been estimated that $547,000,000 of securities of this kind must be refunded during the next three months alone, and of this amount $303,000,000 represent the applications of three so-called typical systems, namely the Pennsylvania, Baltimore & Ohio and New York Central systems. This sum, $537,000,000, which is to be accounted for within the next few months, is equal to more than half of the entire national debt of the United States, yet how much public attention has this fact attracted?

While waiting for a decision in the steam railroad situation it is a satisfaction to record a step in the right direction as regards the electric roads. After an extended and carefully conducted hearing, the Massachusetts Public Service Commission has granted to the Middlesex & Boston Railway permission to charge a 6-cent fare, as described in another part of this issue. We hope that this ruling will suffice as a precedent to other commissions to grant similar relief to companies in other states. The need is great not only so far as the railways and their stockholders are concerned but to the public as well, because the public depends for its prosperity upon the maintenance and extension of proper transportation facilities. We believe that if there was a wider knowledge of the conditions under which our transportation systems are suffering, there would be little difficulty in securing the relief so anxiously sought and urgently needed.

Electric Railway Service in Manila

Historical, Operating and Engineering Features of the Electric Railway Properties in a Large Oriental City—Many Difficulties Overcome in the Construction of the Railways

Electric railway, lighting and power service in and about the city of Manila, P. I., is furnished by the Manila Electric Railroad & Light Company and the Manila Suburban Railways Company, the properties of both companies being operated under the supervision of The J. G. White Management Corporation of New York.

In 1903 Charles M. Swift of Detroit obtained a franchise from the city of Manila to build and operate an electric lighting, power and railway system in that city. The only electric and transportation facilities of importance in Manila at that time were owned by two Spanish corporations, La Electricista and Compania de los Tranvias de Islas Filipinas, the former having been organized in 1892 and furnishing electricity for city lighting and private use, and the latter, organized in 1885, operating horse-car lines in the city and a steam dummy line to Malabon.

The properties and franchises of both Spanish companies were purchased and together were turned over with the new franchise to the Manila Electric Railroad & Light Company, which was incorporated under the laws of the State of New Jersey. In 1906 a franchise for a suburban railway and electric system to Pasig was obtained and turned over to the Manila Suburban Railways Company of Connecticut. The property which

City Limits
Santa Mesa Race Course
Steam R.R.
Scale of Miles
0 ½ 1 2
Lines of the Manila Electric Railroad & Light Co.
" " " Manila Surburban Railways Co.
" " " Proposed Port Works Extension
Electric Ry. Journal

RAILWAY SERVICE IN MANILA—ELECTRIC ROAD CHART

was subsequently constructed, as well as that of the first-named company, was constructed under the supervision of J. G. White & Company, Inc., of New York.

Territory Served

Since the American occupation in 1898 Manila has undergone a steady and rapid growth until it is now known as the "Pearl of the Orient" and has a population, including suburban districts, of about 350,000. Due to its increased wealth and commerce it has been made a regular port for the most important trans-Pacific steamships, thus providing the city with frequent and regular transportation service to and from the United States and principal oriental points.

The main business portion of the city lies north of the Pasig River and includes the principal retail business street known as the "Escolta." The city is in general quite low, a large portion being only a few feet above tide water, and abounding in "esteros" or waterways, which overflow at high tide and flood the low lands. These periodically inundated areas are constantly being reclaimed by materials brought from the higher districts east of the city.

A large population is supported in the rich farming districts surrounding Manila and served by suburban lines which carry passengers and market commodities to and from the urban markets. The development of suburban railway facilities has played an important part in the rapid growth of outlying districts which were previously reached only by various primitive modes of transportation, such as the two-wheeled cart drawn by the "carabao," the native water buffalo, which is commonly used in the islands as a draft animal.

The principal suburban line terminates at Pasig, a city of about 20,000 inhabitants, located about 6 miles southeast of Manila. This line serves various intermediate communities including Fort William McKinley, the principal military post on the islands. Another suburban line reaches Malabon, about 4 miles north of Manila, and runs over the route originally used by the steam dummy line.

Climatic conditions have aided greatly in the development of car riding for both business and pleasure purposes. During the greater part of the year the heat of the day renders walking any distance difficult and very unpleasant. Even before the construction of the Manila railway system the natives had developed the riding habit; in addition to the horse trams there were in 1903 about 5000 private and public vehicles in the city, most of which were drawn by native ponies.

The Filipino is very fond of amusement and his tastes in this regard are accountable for a considerable volume of railway traffic. Various amusements are frequently provided, such as evening band concerts on the "Luneta" (public park), cockpits, "fiestas" of various kinds on numerous holidays, and frequent games of baseball in which the natives have taken very great interest since its introduction by Americans.

Operating Statistics

During 1913 the Manila company carried 16,952,975 revenue passengers, 5,933,767 transfer passengers, and 1,234,202 passengers were carried free. The total of these is 24,120,944. The respective figures for the suburban company are 3,984,948, 382,736 and 88,648. The grand total of passengers for the year was 28,577,276, or approximately 520,000 per mile of track.

The total revenues from transportation of the two companies were $712,941.04 and $128,726.29 respectively; the corresponding car-miles operated were 3,356,165 and 493,804, and the corresponding car-hours 456,687 and 50,739. Taking the population served by the railways at 325,000, the transportation income per inhabitant is found to be $2.58. The transportation revenue for the city lines was 21.2 cents per car-mile or $1.56 per car-hour. The respective figures for the suburban line were 26 cents and $2.54.

The operating expenses for the city lines were $351,156.39, that is 10.45 cents per car-mile or 76.8 cents per car-hour. Of this the labor cost for trainmen for passenger, freight and express cars was $84,167.45, or 2.5 cents per car-mile, or 18.4 cents per car-hour. The operating expenses for the suburban line were $51,023.34, which corresponds to 10.3 cents per car-mile or $1.01 per car-hour. The labor cost in the latter case was $8,801.16, which is 1.78 cents per car-mile or 17.4 cents per car-hour.

Railway Construction

The actual construction of the properties involved many difficulties due to the great distance from sources

of American manufactures and the necessity of using untrained native labor requiring more than ordinary supervision. The older parts of the city presented unusual problems in overhead construction, due to narrow streets on which the second stories of buildings on either side frequently extended beyond the curb line.

Since the completion of the original constructions in 1905 the properties have undergone more or less continual extension and betterment, until they now comprise nearly 55 miles of standard gage track, almost all of which, within the city limits, is in paved streets. In macadamized streets and those without pavement, tracks are constructed of 70-lb. T-rail, creosoted redwood or native hardwood ties and stone ballast. In city streets having more permanent types of paving, track construction is of 92-lb. grooved girder rail laid on concrete foundations. The overhead trolley wires are supported mostly by means of native hardwood poles. There are also quite a number of steel poles set in concrete, and in more recent construction most of the poles are of concrete.

The offices, shops and carhouse are located at Calle Zobel and San Marcelino and are of modern concrete steel construction. The power house, also of concrete and steel, is near by on the Isla Provisora. The shops are very completely equipped, due principally to the distance from the United States and consequent necessity of handling all repair work in Manila.

ROLLING STOCK

The rolling stock of the Manila companies includes a total of 140 cars of the following types: sixty-seven closed double-truck motor cars, fifty-four single-truck and five double-truck open motor cars and fourteen general utility cars.

Passenger cars are divided into two sections to provide for separation of first and second-class riders, those of the first class being seated in the front section. On cars having end platforms, first-class passengers enter and leave at the front platform and second-class passengers at the rear. Cars are provided with two fare registers, one for each class.

After a great deal of experimenting with various types of cars shipped to Manila from the United States,

RAILWAY SERVICE IN MANILA—NEW SEMI-STEEL CENTER-ENTRANCE CAR

the company has adopted as standard for city service a semi-steel center-entrance car constructed in its own shops in Manila. These cars, twelve of which have been built, are very similar to the center-entrance cars in service on the lines of the Brooklyn Rapid Transit Company. They have steel underframes and sides and curved T-iron overhead construction, are 45 ft. in over-all length, have a seating capacity of fifty-four persons, weigh 18 tons, are equipped with electrically lighted routing signs at either end, and are mounted on Brill 39-E maximum-traction trucks. Six of the center-entrance cars are equipped with Westinghouse 68-C motors, and the remainder with GE-203 motors. All twelve are operated by K-36 single-end control.

The stepless principle has proved especially adaptable to Philippine service owing to the small stature and short limbs of the average Filipino, and provides convenience to native women carrying large market baskets on their heads. The center-entrance cars are able to make the regular schedule speeds and are very popular with the public. They lend themselves particularly well to the separation of the two classes.

The monitor roof has been abandoned in favor of the arched type owing to troubles experienced with leakage of the former at times of heavy rainstorms which are

RAILWAY SERVICE IN MANILA—VIEW OF CAR BUILT BY PHILIPPINE NATIVES UNDER FOREIGN SUPERVISION—TYPICAL NARROW STREET SHOWING OVERHEAD PIPE CONSTRUCTION

RAILWAY SERVICE IN MANILA—CONCRETE POLES

frequent in Manila during the rainy season, which is from June to October.

Rates of Fare

The following rates of fare, expressed in terms of United States gold, are in force on the city lines: For first-class passengers, at all hours, 6 cents cash or a 5½-cent ticket; for second-class passengers, 5 cents cash or a 4-cent ticket with a special 3-cent cash fare in effect before 7 a.m.; special ticket fares for school children, 3 cents first class and 2½ cents second class.

The suburban line to Malabon is divided into three zones with fares as follows: First zone to Maypajo, same as city lines; second zone, Maypajo to Sangandaan, cash fares first class 5 cents, second class 2½ cents; third zone Sangandaan to Malabon, same fares as on the second zone.

The suburban line to Pasig is also divided into three fare zones with the following rates in force: First zone, to Santa Ana Junction, same as on city lines; second zone, Santa Ana to Fort McKinley, cash fares, first class 5 cents; second class 2½ cents, and special school ticket fares of 2½ cents and 1¼ cents for first and second class, respectively; third zone, Fort McKinley to Pasig, cash fares, first class 4 cents, second class 2½ cents.

On all lines one-half cash fares for children are in effect.

The company provides special market-car service on some of its lines, the cars having space for market baskets, etc., for which a small extra charge is made. The heavy market travel begins between five and six in the morning and continues until noon. A complete system of inspection is in force for checking the registration of fares; the amount of inspection required has been considerably reduced however by the use of center-entrance cars.

Overhead Construction

Climatic and local conditions have presented difficulties in electric line construction which were unexpected by American engineers. Untreated crossarms shipped to Manila from the United States were found to have a life of only about two years; when creosoted, their life is increased to about six years.

In the case of poles, American and Australian woods rotted or were destroyed by white ants so quickly as to bring about the complete abandonment of their use. A native wood called "ipil" was then adopted and proved very satisfactory except for its scarcity and high cost. This wood is very hard and close-grained, and is heavier than water. An ipil pole lasts from twenty-five to thirty years and costs, in a 30-ft. length, about $18. The company's standard pole is now of concrete, 1:2:3 gravel mixture, reinforced with four ⅝-in. twisted rods which are laced together with No. 12 galvanized iron wire. These poles have a 12-in. square butt and a 6-in. square top, are 30 ft. long and cost $11.50 each. The company has several hundred of them in service at the present time.

Heavy winds during typhoons reach velocities as high as 100 m.p.h. and usually cause troubles with electric lines by blowing branches of trees across the wires, etc.

Power Generation

The initial plant installation of the Manila company was completed in 1904 and included three 750-kw Westinghouse-Parsons turbo-generators and eight 400-hp British Babcock & Wilcox boilers. In 1905 an additional 1500-kw unit together with three 500-kw and one 300-kw rotary converters were installed to provide for the railway load. The old La Electricista plant was completely abandoned in 1906.

Since then the company's power-plant equipment has been increased from time to time until the rated generating capacity now amounts to a total of 10,000 kw. The present generating equipment is all turbine driven and includes two 750-kw Westinghouse-Parsons units, one 1500-kw Westinghouse unit, one 2000-kw Westinghouse unit and two 2500-kw Allis-Chalmers units.

All condensers are of the surface type, the complete equipment including circulating and vacuum pumps

RAILWAY SERVICE IN MANILA—POWER HOUSE—TRACK GANG ON SUBURBAN LINE

having been furnished by Alberger & Company. The exciting equipment comprises two 37½-kw direct-connected Westinghouse exciters, one 50-kw Westinghouse exciter direct connected to a three-phase induction motor and one 100-kw Allis-Chalmers exciter direct connected to an induction motor. All excitation is furnished at 125 volts.

The railway equipment in the main station includes four 500-kw Westinghouse rotary converters and one 1000-kw Westinghouse motor-generator set. One 300-kw rotary converter is located in the substation at Fort McKinley and supplies direct current to the interurban line at that point. The same substation includes equipment for distribution of alternating current for lighting and power to the military post and the city of Pasig.

The boiler plant equipment includes twelve 400-hp Babcock & Wilcox water-tube, hand-fired boilers served by a steel stack 9 ft. in diameter and 175 ft. high. Ten of these boilers are of British manufacture, and two were built in the United States; all are equipped with superheaters. Feed water is heated by two closed heaters of the Goubert type.

The power plant is adjacent to navigable water, as shown in the accompanying illustration, and coal is transferred directly from barges onto the coal pile by means of an Alliance coal conveyor driven by a d.c. motor and having a capacity of 20 tons per hour.

The price of coal has recently been advancing until coal now costs the Manila company $4.80 per ton for Chinese fuel delivered on the pile. Australian coals of higher heating values have been tried, but their use has been given up due to excessive cost and unreliable deliveries. Engineers of The J. G. White Management Corporation have several times investigated the use of fuel oil both on the Manila property and on the Philippine railway located on the islands of Cebu and Panay, with the conclusion that under present conditions the use of coal is more economical. The Manila company has recently obtained a franchise for a water-power development on the Caliraya River about 40 miles southeast of Manila, and it is expected that this development, when completed, will solve the fuel problem. The steam plant, however, will be operated as an auxiliary.

RAILWAY SERVICE IN MANILA—CARNIVAL FLOAT RECENTLY SHOWN BY THE LOCAL COMPANY

During 1912 the maximum peak on a five-minute basis was 6480 kw and the annual load factor amounted to 32 per cent.

LABOR CONDITIONS, ETC.

The various department heads of the local operating organization are mostly Americans and Englishmen. Native Filipinos constitute the greater part of the company's labor except that nearly all of the carpenter work is done by Japanese.

The company has established regular classroom instruction for native employees and has found verbal instruction the most satisfactory method of teaching. Student trainmen usually spend an apprenticeship period of about sixty days under instruction before being placed in the company service.

Filipinos make good motormen and conductors after being thoroughly trained in their duties, and intoxication is practically unknown among them. They develop into good firemen, switchboard attendants, wiremen and linemen, and make excellent workers under competent supervision. The company's policy is to advance native employees to positions of greater responsibility and

RAILWAY SERVICE IN MANILA—NEW CENTER-ENTRANCE CAR EXHIBITED AT THE PHILIPPINE EXPOSITION BY THE MANILA COMPANY

remuneration in accordance with their abilities and services. Under this system many Filipinos have risen to be foremen and to fill important clerical positions.

Motormen and conductors are paid 8½ cents per hour. The average hourly wage of all labor on the weekly payroll including platform men is 7½ cents. While these rates are low in comparison with corresponding rates in the United States, they are very high as compared with labor wages in China and India. The most common languages spoken among company forces are English, Spanish and "Tagalog," the native dialect.

Welfare Work

The company has followed the lead of American companies in the establishment of facilities for athletic games among employees and the provision of free medical service.

Two and a half years ago a baseball team was organized and later a band of seventy-two pieces. The "Meralco" baseball team, composed of native employees, has twice won the amateur championship of the islands and last February won the amateur championship of the Orient, having defeated the champions from Miji University, Japan. The ball team and the band have both been very effective toward promoting the physical and mental development of the native employees.

The company employs a doctor who takes care of sick and injured employees at the company's expense. Tuberculosis is quite prevalent in the islands but since the American occupation the number of cases has been greatly reduced by improved sanitary conditions.

Organization

The personnel of the executive and operating organization is as follows: Charles M. Swift, president; Frederic H. Reed, vice-president; John H. Pardee, vice-president; C. Nesbitt Duffy, vice-president and general manager; T. W. Moffat, secretary; R. B. Marchant, treasurer; L. S. Cairns, assistant general manager; W. M. McGeachin, manager electric department; J. C. Rockwell, manager railway department, and J. B. Russell, auditor.

Effect of War on British Tramways

Enlistment of Men Forces Reduction in Service, Compensating for Falling Off in Traffic

According to Sir A. Stanley, managing director of the Underground Electric Railways, Ltd., London, England, the total of employees of the District London Electric, Central London and City, South London Railways who had gone to war up to Sept. 19 was 936. The result of this drain on the body of employees was to reduce the train service on the District Railway by 2 per cent and on the Tube Railway by 26 per cent. As regards the London General Omnibus Company, the number of men in the service up to the same date was 3399. Consequently it reduced the number of omnibuses in service, averaging 300 to 450 per day. The early closing hour of 10 o'clock has materially affected the traffic after that hour and all services are being reduced. The company now has in training a sufficient number of men to replace those who will enlist from time to time and also to bring the railway and omnibus services up to a sufficient strength to deal with the traffic. It is not expected that any necessity will arise for considering the use of women for any of the work heretofore done by men, and the company has taken steps to care for the wives and families and other dependents of men who have gone to the front.

A. W. A. Chivers, inspecting officer of the British Electrical Federation, Ltd., London, states that the outbreak of the war had an adverse effect upon the traffic receipts of the companies comprising the federation, although the falling off in revenue was not so great as expected. For the first month since the beginning of hostilities the traffic receipts showed a decrease of 4.05 per cent. The effect on the receipts varied in different parts of the country. In some places revenue increases have been recorded owing to activities caused by the war in certain industries, while in other sections increases have been noted on account of activities brought about by the formation of new military stations. The decreases are most marked in seaside towns. This is largely caused by the fact that the railways have been required by the government to furnish military transport service, and with the temporary suspension of excursions and the issuing of cheap tickets has resulted in a reduction in the number of seashore visitors during the middle part of the holiday season. Unfavorable weather conditions also have an adverse effect upon the revenues of certain lines.

During the mobilization period all soldiers, sailors and nurses in uniform were carried free of charge, which in some cases interfered with the ordinary traffic. On Sept. 16 about 1240 men and twenty officials left their employment to join the national forces. The reduction in service to meet the traffic requirements has enabled all undertakings to continue without the necessity of discharging any employees. Moreover, by curtailing the service, economy has been effected in the operating expenses.

On the outbreak of war the management promptly issued notices granting facilities to all men wishing to join the colors and assuring them that upon their return they would be reinstated in their former positions or would be found suitable employment with the federation. The management has also instituted a mutual aid fund for the relief of all employees' dependents. The officers and men contribute a small sum weekly out of their earnings and the companies contribute an equal amount with a minimum of 3d. per week per man employed. Thus far the experience with the fund indicates that the contributions are ample to meet all calls likely to be made upon it. The fund is administered by a specially formed committee at the head office. The managers of the various companies and local committees representing the employees make reports and recommendations to the committee at the head office in regard to grants. The amount of relief granted to dependents varies in each case. The guiding principle is that none of the dependents shall be worse off financially owing to any man on whom they may be dependent having left for service. The arrangements made with the salaried officials who have left to join the colors also vary according to circumstances, but all the affiliated companies have agreed to pay half the salary as a minimum.

The Tramway & Railway World in its issue of Oct. 8 published a table showing the number of employees and the per cent of the total number employed who had joined the colors up to Sept. 30. The total number of tramway employees now serving England in the army and navy is 10,688. In the order of the number of employees in service the first five ranking corporations are Glasgow, 1500; London County Council, 1294; Manchester, 740; Birmingham, 697; Liverpool, 600, and Bristol, 499. The first six companies in the order of the percentage of the total number of employees at war are Kilmarnock, 41 per cent; Dover, 38 per cent; Brighton, 33.33 per cent.; Burnley, 27.5 per cent; Glasgow, 27 per cent and Liverpool, 26 per cent.

The Code of Principles

Why the Code Was Prepared—How It Should Be Used—Brief Discussion of Each Principle by the Chairman of the Public Relations Committee Which Drafted the Code

BY THOMAS N. M'CARTER, PRESIDENT PUBLIC SERVICE CORPORATION OF NEW JERSEY

The electric railway industry has a code of principles prepared after much study and discussion and designed to show clearly what the industry believes to be the fundamental economic basis of its business. Such a code of principles is needed as a guide both to the practice of electric railway companies and to the ruling of courts and commissions. To be effective it must have not only the passive and verbal assent of the railways but their active, constructive co-operation as well. The code must also commend itself to the public by its reasonableness and its fairness.

At no other time in the history of the industry has there been so logical a reason for a declaration of principles or so great a necessity for it. Under the early forms of franchise, contracts were matters of barter between individual companies and communities. Contracts were unscientific, illogical and uneconomic. They generally lacked provision for the protection of capital investment by failing to permit adjustment of rates of fare to suit varying conditions and by limiting the length of franchise term. The tendency to ignore the conditions which must inevitably accompany the termination of a franchise has been general, the intention being apparently to shirk the responsibility by passing it on to future generations.

The present epoch is one of adjustment. It is a crisis in the development of the electric railway industry, and it has become essential that the railways should be able to present their case in such a way that the commissions will realize that there is a railway, as well as a public side to regulation.

The Century Dictionary states that a principle is "that which is professed or accepted as a law of action or a rule of conduct." It is also "a truth which is evident and general." The combination of these two elements in the code is essential to its general acceptance. Whenever a body of people comes to consider certain general principles to be sound and worthy of practice it formulates a creed or code. This crystallizes the existing sentiment and conviction and forms the basis for active and effective propaganda. The electric railways are now in this creed-creating period.

The association has accepted the code of principles. The practical question now arises as to the next step to be taken. It will not be sufficient to compliment the committee on public relations and the sub-committee on the code of principles upon the excellent work which has been done and then proceed to pigeon-hole and forget the whole subject. The code must now be promulgated by educational campaigns of one form and another as outlined in the committee's report. It must be studied by every man in the industry who has any influence with the public.

To further this study the following statements amplifying and illustrating the principles have been prepared with a view to stimulating interest and giving in concise terms the principles underlying the declarations.

I. The first obligation of public utilities engaged in transportation is service to the public. The first essential of service is safety. Quality of service must primarily depend upon the money received in fares. For this reason it is necessary that the rate of fare should be sufficient to permit the companies to meet the reasonable demands of patrons and to yield a fair return on a fair capitalization.

The prime consideration of all transportation service should be safety. Following this, the public is entitled to the best service which can be given for the fare received. Good service means equitable adaptation of available facilities to the needs of the community. It involves cars kept as clean as the nature of the business permits, courteous attendance, reasonable seating capacity and convenient and direct routes so far as the needs of the entire community are concerned. All of this is on the assumption that the public is willing to do its part in granting the use of the streets and operating conditions which, with reasonably good management, will insure a fair return upon the investment. In demanding good service the public must remember that it is the greatest good to the greatest number that is the desideratum. The running of unnecessary cars or the furnishing of unnecessary seats in one direction lessens the facilities that can be furnished in another.

The public is becoming more exacting in demanding more and better cars and longer rides for which it does not offer a larger fare. Frank R. Ford in an article in the ELECTRIC RAILWAY JOURNAL for Oct. 10 showed that the railways are meeting the costs imposed by the demand for better service through more efficient management, but that the net results of this economy are being appropriated by the public in increased taxes. He states further that the development of and investment in the industry are not keeping pace with the increase of traffic. This is due to the small incentive offered to capital to invest in electric railway properties.

II. Regulated private ownership and operation of electric railways is more conducive to good service and the public welfare than government ownership and operation because the latter are incompatible with administrative initiative, economy and efficiency, and with the proper development of cities through the extension of transportation lines. The interests of the public are fully protected by the authority given to regulatory bodies.

Public ownership and operation of electric railways under the present political conditions of American cities would be disastrous. The principal expense in electric railway operation is for labor. The labor expenses are larger in proportion to the total expenses in electric railway work than in any other quasi-public utility, like the distribution of water, gas or electric light. Municipal operation of electric railway systems would injure the credit of the municipality which attempted it because the operation would not be conducted on economical lines, and it would add to the power of the local political machine because it would greatly increase the number of positions to be filled by the party boss. The number of employees in government service is already very great, involving large political patronage. It would be unfortunate if this number should be augmented by the vast army of electric railway employees.

From the standpoint of efficiency there is practical difficulty in securing economical administration of public office. Even in our federal enterprises where politics plays a much less important part than in city and

state governments this is the case. Private ownership and operation under fair and intelligent regulation tend to safeguard the rights of the public while affording the stimulus necessary to the fullest development of the industry.

III. In the interest of the public and good service local transportation should be a monopoly and should be subject to regulation and protection by the state rather than by local authorities.

That local transportation service should be conducted as a monopoly is a fact requiring no proof in these days. Direct competition between electric railways is absolutely destructive. The interests of the public, the companies and the investors are all best served by regulated monopolies, thereby making possible, on the one hand, the elimination of duplication of investment and the attainment of increased efficiency of operation, and, on the other, the guarantee of protection against unreasonable costs of competition to be eventually saddled upon the public.

The present tendency in regulation is entirely toward state regulation as opposed to municipal regulation. One reason for this is that few important public utilities are confined to one municipality. The regulation of such utilities by a large number of independent municipal commissions would work great hardships on the utilities and would appear to give no advantage to the public. Moreover, under our system of government a state commission is more apt to be independent of politics than a city commission.

IV. Short-term franchises are detrimental to civic welfare and growth because they ultimately check the extension of facilities and discourage good service.

Where a franchise is issued for a definite term with no provision for its renewal, the public utility company must invest a large amount of money in property in the street which cannot be removed and may be useless when the franchise expires. The shorter the term the greater the difficulty which the company would experience in trying to recoup its investment during the franchise period. If an electric railway could be built in final form at the beginning and no improvements should be required during the life of the franchise, it would be possible for a company to determine definitely the extent of its investment which it would have to amortize each year so that its stockholders would receive back their capital at the end of the franchise term. But in any growing community the transportation facilities have to be increased with the needs of the public, and any plan of continuous amortization of the investment so that it will all be extinguished at the end of the franchise is not practicable.

The theory upon which the short-term franchise has been defended has been that the public cannot trust the company for a longer period of time. But if the public will not trust the company, why should it expect that the company will trust the public to give fair treatment to the company at the end of the franchise term? Every electric railway franchise should have sufficient life to warrant the company in building and developing a good railway system, and it should contain a provision by which if the municipality should not renew the franchise it will pay the company the fair value of its property.

V. In order to render good service, electric railways must be allowed to earn a fair return on a fair capitalization, and the foundation for this result will be obtained if the issuance and sale of securities representing such fair capitalization shall be legally authorized on such terms as will produce the requisite funds.

That a return commensurate with the risks involved in the business must be offered to investors, if sufficient capital to properly develop the electric railway industry is to be secured, is axiomatic. This is a condition and not a theory. Money is a commodity, varying in price, due to the prevalence of different conditions at different times. Sufficient elasticity in the selling price of bonds and obligations, by way of discount, must be allowed to meet the conditions prevailing at the time the disposition of securities is consummated. Otherwise, the new money, so necessary for development, cannot be procured. In short, the electric railway business, while differing in some aspects, is subject to the same laws of economic trade as are all other business propositions.

VI. Securities which have been issued in accordance with the law as it has been interpreted in the past should be valid obligations on which an electric railway is entitled to a fair return.

The valuation upon which an electric railway is entitled to a fair return should take into account the fair investment that has been required to develop the property. The value should not be merely the physical valuation whether depreciated or not but should include all reasonable expenses that have been incurred in the progress of the art to bring the condition of the company up to what it is to-day. For instance, the expenses that arose from the substitution of cable power for horse power and later of electricity for the cable are legitimate parts of the cost of enabling a railway to render its service to-day. Such changes were instituted primarily for the benefit of the public, and it should not accept these benefits without rendering due returns to the investors whose capital made their provision possible. The non-recognition of securities that have been legally issued in the past causes both the company and the public to suffer.

VII. The relation of adequate wages to efficient operation should always be recognized, but electric railways, being public servants regulated by public authorities, should be protected against excessive demands of labor and strikes.

While every industry should receive all of the protection from the authorities which it needs in the peaceful conduct of its legitimate business, a public utility has a special right to make such a demand because it supplies a public necessity under the regulation of the public. No one is obliged to take service with an electric railway company unless he desires to do so, and a strike among the employees of such a railway company should be regarded with as much public disfavor as a strike in the police department of the municipality.

VIII. The principle of ownership of securities of local companies by centralized holding companies is economically sound for the reason that the securities of the latter have protection against the varying business conditions of a single locality or company and because money for construction and improvements can thus be more readily obtained.

The principle of distributed risks and of economies by doing things by wholesale apply to electric railways as well as to other lines of business. A holding company can operate a number of properties more economically by dividing the overhead charges among them than each property can be operated individually. It can also issue securities which will be more attractive to the investor because his risks are not concentrated in any one property. Hence an electric railway operated by a holding company can give a better service, other conditions being equal, than can a company which has to maintain an independent organization.

IX. In the appraisal of an electric railway for the purpose of determining reasonable rates, all methods of valuation should have due consideration.

When a property is valued for the purposes mentioned, the question is not altogether one of original investment, present investment or reproductive cost new. For instance, if the actual investment is less than the present value a return upon this investment alone denies the right to use the difference between these values and hence impairs the property right to a reasonable return upon the whole. Each of such valuation figures, however, is persuasive evidence of the real valuation of the property. The fact is that, since the property has no fixed market value, the determination of a just valuation means the consideration of as many items as possible, such as the original cost of construction, the amount expended for permanent improvements, the reproductive cost new, the amount and market value of stocks and bonds, the going concern value and all intangible elements that have served to bring both the physical properties and the business to their present stage of development.

X. Full and frank publicity should be the policy of all transportation companies, to the end that proper information may be available to the investor and the public.

Owing to their public character electric railway companies believe that the public has a right to a complete knowledge of their accounts and affairs. Supervised and regulated as the companies are by commissions and doing a public service, they have nothing to conceal but everything to gain by a frank and open policy. Some people believe that every electric railway is rich and prosperous because of the amount of money invested in it. These people forget that an income must be earned on this investment and that labor and materials cost money. There is a vast difference between the million dollars capital of an electric railway company and the nickel which it receives as carfare, and the interest on this capital must be paid out of the margin left in the nickel after operating expenses have been paid.

Investigations of Boiler Explosions

In a recent editorial *Power* strongly advocates that the law, which the committee of the American Society of Mechanical Engineers is to recommend as a model for legislation to restrict the slaughter and damage occasioned by the abuse of boilers and other pressure vessels, should provide for a thorough investigation as to the cause of every serious accident to a boiler.

The board of boiler rules, or some other competent body, should be authorized to carry out this examination, empower to subpœna witnesses, to call for books, papers and other pertinent evidence, and be required to submit a report within a reasonable time, showing the cause and manner of the explosion, and fixing the responsibility. The owner and operator of a plant in which an explosion occurs should be required immediately to report it to the investigating authorities, and penalties should be provided for failure to do so. Insurance companies also should be required to report claims for losses. In this way a vast amount of valuable and authentic information regarding explosions would be accumulated, stress thrown upon the causes which most frequently produce explosions, and a way pointed out to avoid them.

The Chesterfield Tramways Committee, Chesterfield, England, is issuing tokens for free transportation on its tramcars and motor buses to Belgian refugees who are quartered in the district traversed by its lines.

Chicago & Joliet Railway's Safety Campaign

Illustrated Lectures Are Conducted to Interest School Children—Co-operation of Automobile Owners Is Sought

In conjunction with the heads of the city and parochial schools of Joliet, Ill., and the Illinois Steel Company, the Chicago & Joliet Electric Railway has conducted a series of lectures with slides and motion pictures, in the interest of a safety campaign among school children. The pictures shown included reels and slides pertaining to safety methods and precautions used at the Illinois Steel Company's mills, followed by slides and reels pertaining to street and street railway accidents and their prevention. To give the children something to carry away with them and remind them of the lessons of the "safety first" lecture, 6000 blotters calling attention to the urgent need of the safety habit were distributed among them.

The campaign this year was the second of its kind, and the company believes that it has greatly assisted in eliminating accidents, particularly to children. While it is difficult to determine the exact extent to which these lectures have served in promoting safety, it is interesting to note that not a single child has been injured by the street railway within the corporate limits of Joliet since the first safety lecture was given, more than a year ago. It is also interesting to state that out of a total attendance of 958 children at the Joliet schools, the average attendance at the safety lectures was 725. The railway company arranged to transport the children from the various schools to the point where the lectures were given. There were eight lectures in all, requiring a total free car mileage of 314.4, with total car hours of 110, which included the time the cars were held waiting for the completion of the lecture.

CAMPAIGN WITH AUTOMOBILE OWNERS

In conjunction with the safety campaign among school children, another campaign was conducted among automobile owners. The following is a copy of circular letter which was sent to all automobile owners in the city of Joliet.

"As an automobile owner your interests are so identical with our own as regards the avoidance of accidents, we ask for your co-operation in our endeavor to reduce accidents to the lowest possible minimum.

"In the past nine months there have been thirty-five collisions between automobiles and street cars on our system. More care would have avoided these accidents, which, as you are aware, result in more or less injury to persons and damage to property.

"Our car men are instructed always to think of safety first and use of good judgment by having cars under control at dangerous places so as to take no chances.

"Will you kindly bear in mind, and also instruct your drivers, to use all possible care and look and listen when operating across or near car tracks? Also caution them in regard to operating machines past cars when passengers are alighting.

"Too much speed is the cause of most collisions.

"The co-operation of all automobile owners is being solicited to obtain the results we know you would yourself wish to see, and we shall appreciate your assistance."

With this letter to owners of automobiles, a blotter containing safety cautions and suggestions was included. In both of these campaigns the railway company had the full co-operation of the local newspapers, which gave considerable publicity to the various lectures and the results of the campaign.

Electrical Operation On the B., A. & P. Ry.*

The Electrification of this Ore Handling Line Results in Greater Operating Efficiency and In a Saving of More Than 20 Per Cent in Operating Cost

BY J. B. COX, RAILWAY ENGINEERING DEPARTMENT GENERAL ELECTRIC COMPANY

The Butte, Anaconda & Pacific Railway was built in 1892, principally for transfer service between the ore mines in Butte and a smelter in Anaconda. The tracks connecting these two cities are approximately 26 miles in length, but the yards and sidings which were included in the recent electrification of the line bring the total mileage up to about 90.

Work on the electrification began in the spring of 1912, and the first electric locomotive was run experimentally in Anaconda on May 14, 1913. Two weeks later a double-unit electric locomotive took over the regular day service of hauling the ore from East Anaconda yards to the concentrator yards, the distance between which is approximately 7 miles. The load per trip in this service was gradually increased from sixteen cars to twenty-five cars, which is to be the standard for the present. The average time for the up-hill trip with twenty-five cars is about twenty-six minutes so that eight trips per shift are easily made, making possible a delivery of 200 cars, an increase of slightly more than 108 per cent over what had been possible for the crew with steam locomotives. These loaded ore cars average from 70 tons to 72 tons each, making the trailing load for a twenty-five car train from 1750 to 1800 tons.

The regular passenger service between Butte and Anaconda was taken over for electrical operation on Oct. 1, 1913. The distance between the stations—Anaconda to Butte—is 25.7 miles, and the schedule for the trip is one hour. No change has been made in this time, though were it desired a reduction of 20 per cent would be possible with the electric locomotives. As had been done in the freight service, the steam engineers in the passenger service were transferred from the steam to the electric locomotives with but little previous instruction, and after the first day or so were left mostly to themselves. It may be of interest to note here that on the day shift, averaging four trips per day, no passenger train came in late on account of engine trouble during the first five months. There follows a comparison of the delays to the passenger trains for the month of June, 1913, under steam operation with the same month in 1914 under electrical operation.

	No. of Trains	Meeting Points, Hr.Min.	No Power, Hr.Min.	Lost Engine Failure, Hr.Min.	Lost Running Time, Hr.Min.	All Causes, Hr.Min.
Steam, 1913.....	272	15 49	.. ..	.. 44	4 13	20 46
Electric, 1914.....	280	3 54	.. 27	.. 24	.. 25	5 10
Decrease	8*	11 55	.. 27*	.. 20	3 48	15 36
Percentage of saving due to electrical operation.	2.94*	75%	.. ..	45%	90%	75%

*Increase.

On Oct. 10 a double-unit electric locomotive was put in the day-freight service on the main line between East Anaconda and Rocker, a distance of 20.1 miles. The standard train that had been hauled on the trip was about fifty loaded ore cars weighing approximately 3500 tons gross, and the average running time of such trains where no stops were made was about one and one-half hours, corresponding to an average speed of approximately 13.4 m.p.h. In the beginning the electric locomotive took only the standard train but it made the trip without stop in about one hour, corresponding to an average speed of 20 m.p.h. The ruling gradient on the westward trip is 0.3 per cent grade, and with a fifty-five car train the steam locomotive made about 7 m.p.h. The electric locomotives with similar trains now make about 16 m.p.h. on the same grade. The weights of the trains hauled by the electric locomotives on this run have been gradually increased up to sixty-five loaded ore cars averaging about 71 tons each, making the trailing load about 4620 tons. Adding 160 tons for the weight of the double-unit electric locomotives and 20 tons for the caboose makes a gross train weight of approximately 4800 tons.

The remainder of this class of freight traffic was gradually taken on during the months of October and November, thus completing the electrification of the main-line service. A comparison of the month of June, 1913, under steam operation, with the same month, 1914, under electrical operation, shows that with a slight increase in the total tons of ore hauled the average tonnage per train was increased from 1761 to 2378, or 35 per cent, thus decreasing the average number of trains per day from 12.5 to 9.3. The average time per trip during steam operation was approximately two hours and twenty-five minutes, while with the electric locomotive it was approximately one hour and forty-five minutes, showing a decrease of forty minutes, or 27.5 per cent. These figures represent the time put in by the crews between Rocker and Anaconda, the distance being 21.8 miles. The result of these improvements is that the overtime in this particular service has been decreased 73.5 per cent and the total time 42 per cent, resulting not only in greater economy to the railway company but in shorter and easier hours for the crews.

During the year's operation difficulties especially attributable to the higher potential have been negligible, and while there have been occasional instances of arcing and flashing or short-circuits due to ordinary causes, the resultant damage has been really smaller than might be expected from a like occurrence on a 600-volt installation of equal capacity.

The original brushes supplied in the motors chipped badly, and before all these had been replaced it was often found when the units were brought in for regular inspection that some of the brushes were broken entirely into pieces, and while there was evidence that a flashover might have occurred at some time no harm had resulted other than the blowing of the motor fuse, on the replacement of which the engine was continued in service until its regular time for inspection when the cause of the fuse blowing would first be discovered.

The fact that the locomotives continued in service thus is sufficient evidence of the harmlessness of the arc-over, and in no instance of the kind has any real damage been done. The locomotives have made from 25,000 miles to 50,000 miles each and without exception the motors are in excellent condition. The wear on the commutators is imperceptible and the general performance of the entire equipment is quite as satisfactory

*Abstract of a paper presented at the Pacific Coast meeting of the American Institute of Electrical Engineers, Spokane, Wash., Sept. 10, 1914, and printed in the *Proceedings* of the Society for November.

and promising as that of any railway equipment with which the writer has had experience in service of similar kind.

The overhead construction has been satisfactory and a recent examination of the trolley wire shows no indication of unusual wear. The roller pantographs are operating quite successfully, the average life being from 10,000 to 12,000 miles per roller. Where a double-unit locomotive is operated, the two pantographs are connected electrically by a main bus line, and the average current collected by each, when ascending the grades with standard loads, is from 350 amp to 400 amp. Two pantographs operating in multiple thus will collect more than double the current that can be successfully collected by a single pantograph for the reason that sparking is usually due to the momentary breaking of contact between the trolley wire and the roller caused by hard spots in the line. When two pantographs are operated in multiple both do not encounter these hard spots at the same instant, hence one of the two is more apt always to be making good contact, so that the flow of current is not so frequently interrupted and the sparking is greatly reduced. The double units operating on Smelter Hill were run experimentally for several days with only a single roller making contact with the wire, the operation being quite successful with the single roller collecting an average of 650 amp to 750 amp while running at 16 m.p.h. or 17 m.p.h. and from 800 amp to 1000 amp during the accelerating period in multiple. The sparking was not serious except at hard points in the line, and with two rollers in multiple there should be no difficulty in collecting 500 amp or 600 amp per roller. This at 2400 volts should be equal to the requirements of any ordinary locomotive unit.

The bearings first used in the rollers were provided with ordinary bushings lubricated with oil, but when the bushings became slightly worn the oil was thrown out along the spindle and had to be replenished at comparatively frequent intervals. Later, roller bearings with grease lubrication were installed with excellent results. As yet these have not been in operation a sufficient length of time to definitely indicate how long they may be expected to last, but it would appear that the bearing will last much longer than the roller and that the attention required for the adjustment and lubrication of the bearing or the roller will be negligible.

Only minor changes have been made in the personnel of the maintenance or operating departments of the railway on account of the electrification and there has been no reduction in salaries or wages. An extra man with electrical experience was placed in the shops to supervise the electrical repairs to the locomotives and three linemen were retained for the maintenance of the trolley system.

Three steam switching locomotives used for concentrating the ore at, and distributing supplies from, the Butte Hill yards have been continued in this work. Another steam locomotive is used on the Georgetown branch and a fifth one operates at intervals over unelectrified tracks at the Anaconda end. Approximately 20 per cent of the total locomotive miles now being operated is by these five steam locomotives, the cost of which is upwards of 40 per cent of the total cost of all locomotive performance.

From the regular monthly locomotive performance sheets of the railway company the principal saving resulting from electrification appears to be due to the partial substitution of electric power for coal, at the rate of $150,727 per year. The approximate price of coal for locomotives is $4.25 per ton. With a single exception, that for depreciation of equipment which is taken at $2,711 per month for electric locomotives as against $1,340 for steam, every item of expenditure in the locomotive performance sheet shows a substantial percentage of decrease in favor of electrical operation.

The total saving from locomotive performance alone is at the rate of $237,582 per year, to which should be added credit for handling an increase of traffic at the rate of 13,938,136 ton-miles per year, or 8.77 per cent more than was handled by the steam locomotives during the period compared. To this saving from locomotive performance should be added the saving from trainmen's wages, which is at the rate of $31,146 per year, or a decrease of approximately 21 per cent, due largely to the elimination of overtime. This makes the total saving from these two items $268,728 per year. From this should be deducted $10,839 for maintenance of the distribution system, leaving $257,889 as the net saving per year due to electrical operation.

The roadmaster states that it is quite evident that the electric locomotives are much easier on the track at curves but that there is no noticeable difference on tangent track, and that while sufficient time has not yet elapsed to form definite conclusions, present indications lead him to expect that any difference relative to his work will be favorable to the electric locomotives.

Arranging the items of expense in the order of usual appearance in the summary of a standard locomotive performance sheet and placing them on a yearly basis results as follows:

Item of Operating Expenses	Steam, 1913	Electric, 1914	Decrease, 1914	Per Cent Decrease
Fuel and power.....	$315,235.74	$164,508.70	$150,727.04	47.81
Repairs	124,787.90	92,278.08	32,509.82	26.05
Enginemen's wages.	104,461.18	71,225.88	33,335.30	31.80
Enginehouse expense	29,907.80	18,638.38	11,269.42	37.68
Water	4,953.66	1,193.70	3,759.96	75.90
Lubricants	9,751.44	4,942.32	4,809.12	49.30
Other supplies	5,823.52	4,552.36	1,271.16	21.83
Total locomotive performance ...	$594,921.24	$357,339.42	$237,581.82	39.93
Trainmen's wages...	147,632.30	116,486.00	31,146.30	21.10
Grand total	$742,553.54	$473,825.42	$268,728.12	36.19
Ton-miles hauled ...	158,917,720	172,855,856	13,938,136	8.77

The total cost of the electrification, including a change of signal system on Smelter Hill, an extra motor-generator set recently installed at Anaconda, interest during construction and all incidentals due in any way to the electrification, was in round numbers $1,200,000. This does not include the stepdown transformers which are the property of the power company, but on the other hand no deduction has been made for the salvage due to the elimination of twenty steam locomotives.

If a correction be made for the item of depreciation (which does not appear in full on the 1914 records) the total net saving would be reduced to $242,299, which is equivalent to 20.02 per cent on the entire cost of the electrification, to say nothing of the increased capacity of the lines, the improvement in the service and more regular working hours for the crews.

If taken on the basis of the increase shown in net operating revenue, or operating income, this percentage is slightly greater, the rate of increase per year for these items being $288,150 and $282,016 respectively. The estimate on which the decision to proceed with the electrification of the road was made placed the annual net saving expected at 17.5 per cent of the cost, so that the results financially have been quite as satisfactory as the general performance of the equipment.

To assist in caring for the large number of wounded brought to Vienna, from the Galician battlefields, the Vienna Tramways has converted sixty trailers into hospital cars which were made available for four stretchers each by removing the seats. The wounded soldiers are transported in trains of four cars consisting of an ordinary motor car and three of these converted hospital cars.

The Bow Trolley on the Indianapolis & Cincinnati Traction Company's Lines

The Bow Trolley, Which Is Widely Used in Europe, Has Received Very Little Consideration in This Country, But Its Ability to Reduce Arcing Has Proved Very Satisfactory on This Interurban Railway

A recent inspection of the overhead contact system on the lines of the Indianapolis & Cincinnati Traction Company has disclosed the fact that the bow trolleys installed on all of the railway company's cars have proved to be thoroughly satisfactory after nine years of operation. This form of contact device, notwithstanding its extended use in Europe, has received but little attention in the United States, and an account of the Indianapolis & Cincinnati Traction Company's experience with it affords a considerable amount of interesting data.

The line, which has been described in detail in previous issues of the Electric Railway Journal, extends from Indianapolis, Ind., to Connersville, Ind., via Rushville, a distance of 58 miles; and from Indianapolis, Ind., to Greensburg, Ind., via Shelbyville, a distance of 50 miles, making the total length of the road 108 miles. There are three grades, each about 1 mile long, with gradients of 2 per cent, 2½ per cent and 3 per cent. The remainder of the line has no gradients of more than 2 per cent.

The passenger cars are 55 ft. long, and have four Westinghouse 100-hp motors, 22.61 gear ratio, 37-in. wheels and Westinghouse "AB" control. Each weighs, complete with equipment but without load, 50 tons. These cars are operated as single units. The freight cars are 55 ft. long and are equipped with four 100-hp motors having a gear ratio of 16.67 and mounted on 37-in. wheels. These freight cars are equipped to pull freight trailers.

An hourly schedule is maintained by the passenger cars. Considerable freight traffic is handled, one train being run each way on each division. The maximum speed of passenger cars is approximately 60 m.p.h. on straight, level track and while drawing power from the trolley.

The main trolley line is made up of No. 000 standard grooved wire supported on catenary construction with rigid hangers. It is supplied with single-phase current at 3300 volts, except for about 3 miles within the city limits of Indianapolis where, upon the lines of the Indianapolis Traction & Terminal Company, ordinary span-type construction is used with 500-volt direct current. All of the electrical equipment was installed by the Westinghouse Electric & Manufacturing Company. C. L. Henry, president, and G. W. Skipton, master mechanic and superintendent of overhead, state that the overhead construction has been eminently satisfactory. During the nine years of operation on the 41-mile division from Indianapolis to Rushville and the seven years of operation on the remainder of the road, there have been only six breaks in the trolley wire. In a recent breakage of the messenger wire, the trolley wire, then in use more than nine years, accepted the additional strain without difficulty. Traffic was held up but twenty minutes, or until the two ends of the messenger cable could be tied around near-by poles. During the few hours required to repair the messenger wire no difficulty in maintaining traffic was experienced.

No difficulty has been encountered from the rigidity of catenary construction, and "hard spots" in the overhead lines are unknown. It is claimed that a considerable amount of inherent flexibility is present in the construction, and the operating officials do not believe that any additional flexibility is required. However, the satisfactory operation secured with the rigid construction is considered to be due largely to the inherent flexibility of the bow trolley which is used.

Slack is taken out of the line at no regular intervals. In a number of cases this condition is cared for by straightening up of poles at the curves, since it was found that, after several years of operation, the poles have leaned slightly. Straightening the poles has per-

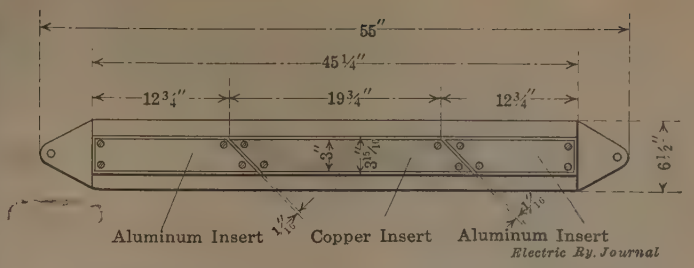
INDIANAPOLIS & CINCINNATI BOW TROLLEY—VIEW SHOWING RIGID CATENARY OVERHEAD TROLLEY CONSTRUCTION

INDIANAPOLIS & CINCINNATI BOW TROLLEY—VIEW SHOWING RIGID CATENARY OVERHEAD CONSTRUCTION

formed the same function, in a particular locality, as the renewal of 1 ft. or 2 ft. of the copper trolley wire. However, it is expected that, during the coming spring, sections will be removed from the trolley wire on several of the tangents.

BOW TROLLEYS

The bow trolleys installed on the cars have, in the opinion of Messrs. Henry and Skipton, rendered excellent service. It has, however, been suggested that the weakest point of the bow trolley ought to be near the base. At present the weakest point of the construction



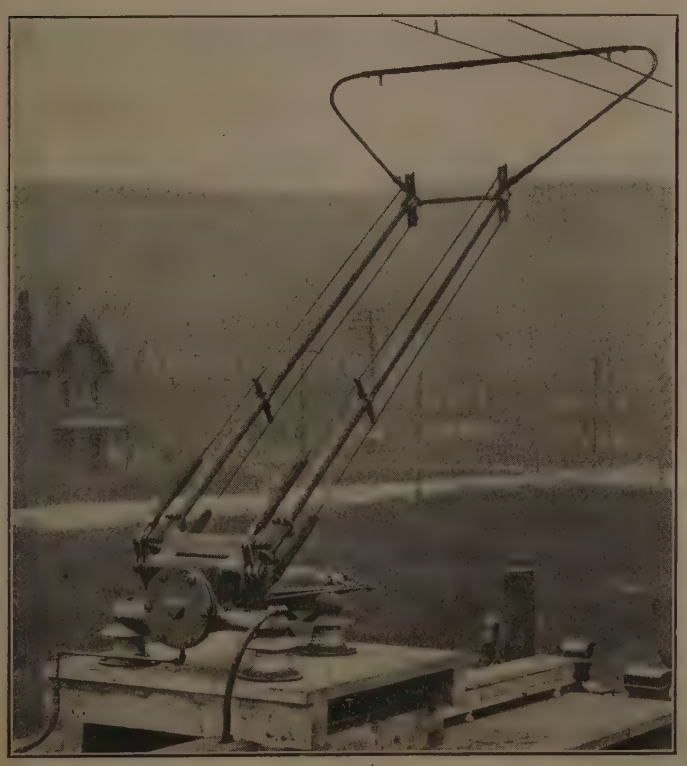
INDIANAPOLIS & CINCINNATI BOW TROLLEY—APPROXIMATE OUTLINE OF BOW-TROLLEY SHOE SHOWING INSERTS IN FACE

is where the bow, which holds the contact shoe, connects with the poles or uprights. In one or two cases the trolley has failed at this point, and the uprights have torn down the messenger wires, striking them when the car was moving at a high speed. The company is reinforcing the bows at the present time by inserting a tube about 18 in. long inside of the bow to strengthen it at this point.

In addition, since the trolley wire has to be raised at railroad crossings from the normal height of 18 ft. to provide a clearance of 22 ft. the bow trolley does not operate reliably because it is adjusted for the 18-ft. height of trolley wire. It is, of course, primarily important that the cars should always have power at railroad crossings, and instructions are in the hands of the transportation men to use the wheel trolleys at all such points. It is impossible, however, for the bow trolley to be made to operate reliably under different heights of trolley wire. The wheel trolleys with which the cars are equipped are ordinarily used with the 500-volt system in the city of Indianapolis.

PRESSURE OF CONTACT ON TROLLEY WIRE

A pressure of 12 lb. is used for the contact of the bow trolley against the trolley wire, and the trolleys are adjusted to give this. The trolley wire is prone to deflect when the bow trolley is against the wire, as no steady strains are used except on the curves. This arrangement presented the possibility of the contact strik-



INDIANAPOLIS & CINCINNATI BOW TROLLEY—FRONT AND REAR VIEW OF BOW-TYPE TROLLEY

ing the messenger cable, and the pressure on contacts was therefore reduced until this danger was eliminated.

The actual weights of the detailed parts of the bow trolley, not including the base, are as follows:

Slide or contact, without inserts	13 lb.
Copper inserts	3½ lb.
Aluminum inserts	4¾ lb.
Tubing	7 lb.
Poles or uprights	32 lb.
Necessary clamps for holding tubing	5 lb.
Suspension rods (four)	4 lb.

These details, with the necessary screws for holding the copper inserts in place and the several bolts required, will give a total of about 70 lb. for the bow trolley, excepting the base.

Contact Shoes

The diagram on page 1053 shows the general form and dimensions of the contact shoes and also the relative position of the copper and aluminum inserts. The aluminum inserts are of extruded aluminum, purchased from the Aluminum Company of America at a price varying from 46 cents to 58 cents per pound, depending upon the market conditions. The two aluminum contacts at both ends of the slide are ⅛ in. thick.

The copper insert at the center slide is of a fairly hard grade of rolled copper, ⅛ in. thick. The life of the copper inserts is, under ordinary conditions, about 2000 miles. During sleet storms, however, it is customary to replace these copper inserts, and sometimes the entire contact, after one day's operation, or about 400 miles of service. But in excellent weather the life of the copper inserts exceeds 2000 miles.

The life of the aluminum inserts at both ends of the slide is a little less than that obtained from the copper inserts at the middle of slide. The operating department estimates this to be about 1800 miles on the same basis as the estimated life of 2000 miles given for the copper inserts.

The trolley wire of the Indianapolis & Cincinnati Traction Company is not staggered, and difficulty exists at times due to the wire wearing grooves in the copper contacts, requiring replacement within three or four days. There are instances where a groove has been worn in one of the aluminum inserts at either end of the slide. This condition is to be corrected as the trolley wire is to be staggered.

There is used on the contacts a heavy grease of such a consistency that it will not become liquid even in hot weather, and this tends to reduce the frictional wear on the contacts and trolley wire.

Current Collection

The collection of current by means of the bow trolley from the rigid catenary construction is thoroughly satisfactory to the railway company, and in good weather there is said to be no arcing. Sometimes, when the weather is rainy, and there is some water deposited on the trolley wire, small arcs are visible, particularly in the evening. This seems to be due to the water on the trolley wire. It occurs at no particular place on the trolley wire; that is, arcing is no more apparent at the hangers than between the hangers. The wheel trolley is used at times on the high-tension trolley, but only in cases of emergency. Where there is water on the trolley wire, the arcing with the trolley wheel is somewhat more noticeable, particularly at the hangers. The theory held is that the ears of the rigid hangers prevent proper contact of the trolley wheel.

Wear on the No. 000 trolley wire has caused no trouble to date. Samples taken from the trolley wire indicate the remarkable condition that only one-fifth or one-sixth of its useful life has been utilized notwithstanding that it has been steadily in use for nine years.

The standard trolley bases for the wheel trolleys are mounted on insulators similar to those used with the bow type of trolley. The life of the trolley wheel, when operating on the 500-volt d.c. sections within the city limits of Indianapolis, is between 2000 and 3000 miles. It has the following characteristics: diameter, 6 in.; bearings, ¾-in. diameter, 1¾-in. length; method of lubrication, graphite grease.

The members of the operating department of the Indianapolis & Cincinnati Traction Company are unanimously in favor of the bow trolley on account of its flexibility. The difficulty of adjustment for different heights of trolley wire and of operating a car in the reverse direction with the bow trolley is admitted by the operating men, but it is felt that the many advantages outweigh these objections.

Railway Electrical Engineers Convention Proceedings

An account was published last week of the early sessions of the Railway Electrical Engineers convention at the Hotel LaSalle, Chicago. The meeting on Thursday, Oct. 29, was opened by H. R. Bucks, chairman of the committee on axle lighting equipment. It described the general tendency of steam railroads toward axle lighting in preference to other systems, but called particular attention to the high cost of maintenance for the dynamos as compared with other parts of equipment. That for the storage battery, for instance, was found to amount to only about one-half that for dynamos. The report of the committee on rules for car wiring included specifications for complete systems to conform with the underwriters' rules. This report was read by Chairman F. W. Everett, Atchison, Topeka & Santa Fé Railroad.

J. L. Minick, chairman of the committee on outside construction and yard lighting, submitted a complete report which recommended close adherence to the rules of the National Electrical Code and standard specifications of the National Electric Light Association for railroad crossings. This was followed by the report of the committee on illumination which investigated the subject of illumination in classification yards, a completion of the report on day-coach lighting tests and a résumé of recent developments in arc and incandescent lamps.

At the Friday session of the association the report of the committee on yard facilities for charging storage batteries was presented. Following the report of the auditing committee the annual election of officers occurred, and the following were unanimously chosen: President, H. C. Meloy, Lake Shore & Michigan Southern Railroad, Cleveland, Ohio; senior vice-president, E. W. Jansen, Illinois Central Railroad, Chicago; junior vice-president, E. J. Causland, Pennsylvania Lines West, Chicago, and secretary-treasurer, Joseph A. Andreucetti, Chicago & Northwestern Railroad, Chicago. L. B. Hensel, Frisco Lines, St. Louis, Mo., and J. L. Minick, Pennsylvania Railroad, Altoona, Pa., were elected to the executive committee.

At the annual election of the Railway Electric Supply Manufacturers' Association, which holds an exhibit in connection with the Association of Railway Electrical Engineers, the following officers were chosen: President, W. F. Bauer, Edison Storage Battery Company, Chicago; vice-presidents, T. Mount, Consolidated Railway Electrical Lighting & Manufacturing Company, New York, and Fred F. Skeel, Crouse-Hinds Company, Chicago. J. Scribner, General Electric Company, Chicago, was elected secretary, and A. J. Cole, W. A. Fawsett, Edward Wray, T. W. Bender and J. Scribner were elected directors of the association.

Middlesex & Boston Rate Decision

Massachusetts Public Service Commission Authorizes Increased Fares on Middlesex & Boston Street Railway —Résumé of One of the Most Exhaustive Discussions of the Fare Problem Ever Applied to a Suburban Electric Railway System—Enunciation of Broad Policy of Protecting Electric Railway Investments

The Massachusetts Public Service Commission on Oct. 28 handed down a decision of nearly 20,000 words in the Middlesex & Boston Street Railway fare case, which has been pending since July 3. Accounts of the progress of this case have appeared in the news columns of this paper. The company desired to establish a 6-cent fare throughout its system, with an additional charge of 1 cent for every transfer issued. The prevailing fares at the time of the company's notice of the proposed change were 5 cents within Newton and Waltham, with an additional cent for every transfer, except that 6 cents was charged on the old lines of the Newton & Boston Street Railway. The fares on the other lines were 6 cents with free transfer privileges, and the company issued a fifty-ticket book for $2.50, good west of Newton Lower Falls. The average fare received per passenger was 5.44 cents, and the desired increase, if allowed, would have produced an annual increase of about $110,000, or from 10 to 12 per cent upon the company's present passenger revenue of about $950,000. After exhaustive public hearings and investigations by the commission, the company was authorized to establish a uniform fare of 6 cents throughout its territory, but was required to sell nine tickets for 50 cents good between fare limits where the present cash fare is 5 cents and to furnish free transfer privileges at all existing transfer points.

Right to Charge More Than 5 Cents

A fundamental question presented by the remonstrants was as to a lawful right to charge more than 5 cents for a single fare on certain lines in Newton, Wellesley and elsewhere. It was asserted that a maximum fare of 5 cents had been agreed upon in connection with location grants made by municipal authorities. The commission holds, however, that the public service act (Chap. 784, Acts of 1913) empowers the commission to regulate and prescribe just and reasonable rates notwithstanding any such agreements. (Springfield vs. Springfield Street Railway, 182 Mass., 41; Clinton vs. Worcester Consolidated Street Railway, 199 Mass., 279; Keefe vs. Lexington & Boston Street Railway, 185 Mass., 183; Westwood vs. Dedham & Franklin Street Railway, 209 Mass., 213.) The commission rules "as a matter of law that any alleged conditions or limitations as to fares contained in original grants of locations or growing out of agreements or attempted agreements between municipal authorities and the petitioning railway or any of its antecedent constituent corporations are not valid and controlling as against the rate-making power now vested in this commission by the public service act."

Basis for Fair Return

An extended discussion of value as determined by invested capital rather than by reproduction cost is included in the decision. Some remonstrants contended that the present value of the property used by the company is the only amount upon which it should earn a return. In the board's opinion, however, there is a widespread attempt to misinterpret the real meaning of the United States Supreme Court in opinions dealing with fair value in computing a reasonable return. The refusal of that court to base a return upon securities issued with little or no regard to the value of the property put at the public service, cannot be fairly construed as a ruling that the capitalization laws of Massachusetts and the necessary corollaries therefrom are obnoxious to the Constitution of the United States.

In Massachusetts during recent years reproduction cost as a basis for rate-making has been urged on behalf of certain public utilities, mostly gas companies, that have accumulated out of excess earnings or by unearned increments in land values, large amounts of property not represented by the original capital invested or by the securities issued under the local anti-stock-watering laws. The commission concedes that this cost of reproduction is frequently illuminating and is often the best method of checking up unsatisfactory accounting, particularly that dealing with depreciation. It believes, however, that as a fundamentally controlling principle no theory could work out grosser injustice. In cases of excessive rates, by means of which the companies have accumulated large amounts for capital expenditures, the reproduction cost theory requires the ratepayer to pay a rate that will not only provide for a return upon the capital furnished by the investor but also furnish additional capital and a return thereon. This theory is also grossly unjust to prospective investors, for, if under the most honest and prudent management the plant in building up business depreciates below the fair cost to the investors, the rates must be made adequate to allow a return upon only the reproduction cost of the property in its depreciated condition. This amounts to saying that money lost during the earlier stages of a public service enterprise is irretrievably lost by the stockholders; that if rates have not paid the cost of service, this is the permanent misfortune of the stockholders.

The commission characterizes this theory as being as inexpedient as it is unjust. Public utilities are not finished; they are in process and are constantly calling for new capital in increasing amounts. They must be kept on good trading terms with the investing public or the whole experiment of private ownership and public regulation will fail. It is as necessary to attract capital into public utilities as it is to prevent mismanagement of, or extortion by, such companies. In the long run the rate-paying and the investing publics will be best served if regulation makes as its fundamentally guiding principle the protection of investments honestly and prudently made and wisely managed. Any other theory involves essential injustice, tends to make the development of public utilities a speculation instead of an investment, operates as a premium upon various kinds of fraud and makes every rate case an almost interminable and labyrinthine inquiry into values, with endless conflicts between so-called experts.

Partly owing to the limited scope of the rate-making power possessed by the (former) Railroad Commission, the commission says that there has hitherto been little occasion to deal in detail with the principle that investment and not reproduction cost is in Massachusetts the basis of the relation between the rate-paying public and the investing public. Any other theory, however, will be found to be utterly inconsistent with Massachusetts law. From the time of the granting of the earliest railroad charters in the State, legislation has gone upon the theory that capitalization should be

limited to the actual investment and that rates were to be figured on the capital. The Massachusetts public utility code is in striking contrast to the loose and haphazard legislation as to capitalization in many other states, which has frequently resulted in compelling their regulating commissions to resort to reproduction cost as perhaps the least unsafe basis for determining a fair rate.

Financial Condition of Company

The Middlesex & Boston Street Railway is the result of the consolidation of ten companies. Its capital stock is $1,987,000; its funded debt, $1,983,000, and its floating debt, $1,250,000. The average dividend paid upon the capital stock of the constituent companies from the time of their respective organizations down to the date of consolidation into the Middlesex & Boston Street Railway was 3.09 per cent. The average dividend paid on the stock of the consolidated company is 4.35 per cent. The interest upon the floating debt, amounting, at 6 per cent, to about $70,000 per year, has been a heavy charge against revenue. The company now carries a deficit of more than $265,000, or, including bond discount, of more than $300,000.

Profitable Lines versus Unprofitable Lines

The cities of Newton and Waltham argued that it was unfair for the company serving them to be saddled with a debt growing out of the past unprofitable operation of certain other lines. They asserted that the stockholders of such lines, seeing no reasonable possibility of making earnings on their own lines adequate to insure dividends, obtained through a voluntary association, the Boston Suburban Electric Companies, control of profitable lines. They contended that rates in the more densely populated communities should not be increased above 5 cents, in order to pay interest on debts incurred or operating deficits now alleged to have accrued on the poorer lines. The commission holds, however, that while it would be its duty to refuse to approve a consolidation if it appeared that because of it facilities for travel were to be diminished or fares increased, it is not sound to say that a consolidated company must give exactly the same rates of fare when the traveling facilities are radically increased. The thin lines operate as feeders for the lines in thickly settled communities, thus increasing the traffic on the latter by an unascertainable amount. If the commission should rule that, in determining a just and reasonable rate upon any short line where traffic is dense, it must recreate the conditions which might have existed on that short line if it had remained in the ownership and control of the single company formerly owning it, the result would be inextricable confusion and a sort of chaotic adoption of the zone system found in many European cities.

The commission rules that the Middlesex & Boston Street Railway must be dealt with as a single company, but the prudence of its investments is to be considered in fixing the return. While the commission feels that it would not be in the public interest to rule that any of the capital invested in the creation of any of these lines was so recklessly and imprudently invested as now to warrant the adoption of a policy likely to result in abandoning or tearing up some of them, it believes that undoubtedly in more optimistic days street railways were built in Massachusetts upon which a full return cannot now be earned without charging rates intrinsically unfair and perhaps destructive to traffic. Public interest and public sentiment require, however, that, within all reasonable limits, such lines should be conserved, not only for a probable increase in population, but for a probable increased handling of express, light freight and farm produce. There are reasonable limits to the arguable discrimination growing out of requiring patrons of street railway lines in the thickly settled communities to pay more than the cost of their short carriage in order to contribute to losses incurred in the longer hauls through the thinly settled sections. But the "short riders" of to-day may be the "long riders" of to-morrow. Moreover, population centers profit in many indirect ways from street railway lines ramifying into rural sections. A sound transportation policy requires consideration of the relations between transportation facilities and living conditions. The commonwealth, which expends the taxpayers' money in the construction of good roads all over Cape Cod and through the Berkshires, would not be content with a policy which promoted the abandonment and destruction of existing street railway facilities in Eastern Massachusetts.

Capitalizing Property Purchased from Receiver

One of the components of the Middlesex & Boston company is the former South Middlesex Street Railway, which was purchased at a receiver's sale in 1907. In accordance with the statute (Acts of 1906, Chap. 483, Part 3), that part of the company's debt growing out of its attempt to purchase the South Middlesex company for $125,000 in excess of the latter's replacement cost, is illegal and must be cancelled. (Commissioner White dissents from this view, and the decision says the company can test the impending order of cancellation by appeal to the Supreme Judicial Court.)

Relations with Holding Company

Discussing the relations of the road with the Boston Suburban Electric Companies, the board finds that the control of a street railway by a holding company, which loans large sums to the former at a substantial profit to the latter; which controlled a company selling power to the railway (not the Edison Electric Illuminating Company of Boston referred to elsewhere), and also controls a park company to which large annual payments are made by the street railway, is obnoxious to sound principles of corporation management and confusing to a proper system of regulation. Such interlocking management calls in question the validity and advantage to the street railway of all contracts growing out of the common control. As regards the park, the board looks with displeasure upon investments of electric railways off their lines, although favoring within narrow limits expenditures for advertising of direct probable return.

Rates Paid for Borrowed Money

Since the consolidation, the largest single function performed by the holding company has been that of loaning to the railway more than $1,000,000 at an average rate of 6 per cent. While the propriety of this rate is said to be not fully sustained, the commission concedes that the railway, without having its credit buttressed by this pooling device of the stock, might not have been able to procure this sum in the open market at a substantially lower rate. In the last six years the holding company has furnished the railway about $3,308,109 at an average rate of 4.59 per cent.

Cost per Mile of Single Track

The cost per mile of single track, compared with the average cost for fifty-two other Massachusetts street railway exclusive of the Boston Elevated and the West End Street Railway, is:

	Middlesex & Boston	Other Roads
Construction	$23,440	$23,098
Equipment	9,867	7,732
Other permanent property	7,678	8,254
Total cost per mile	$40,985	$39,084

This showing, the board finds, is on the whole favorable to the company.

COST OF POWER

The commission concludes that the company has not fully sustained the burden of showing that its contract made with the Boston Edison Company for power, cotemporaneously with the sale by the holding company to the Edison company of the plant at Waltham formerly furnishing a considerable portion of the power used by the railway, was the best available arrangement for the latter. The railway receives energy from the Edison company on a ten-year contract at the rate of about 1.75 cents per kw-hr., present average. The company is ninth in a list of Massachusetts roads in its power cost per car-mile, at 4.76 cents, as compared with minima of 2.96 cents for the Bay State Street Railway and 2.26 cents for the Boston Elevated Railway. Maintenance of power equipment is included in these figures. The commission is of the opinion that the power cost is high, although probably not more than $12,000 per year. The commission holds that the company cannot be permitted to buy its power at a high price and to keep, permanently, unused power plants of its own. Within a reasonable time it should equip and use its own plants or sell the unused property and apply the proceeds to a diminution of the obsolescence. The commission recognizes the tendency toward tidewater generating stations of large capacity, but suggests that the large power business of the Edison company be regulated as to price by the Gas & Electric Light Commission. It also points out the desirability of more competition in this field, touching upon the possible advantageous supply of electricity from railways with plants on tidewater to interior companies.

DEPRECIATION

The commission points out that few Massachusetts companies have of recent years charged enough to operating expenses to cover real depreciation. In this particular case, an analysis of the company's operations, allowing 20 per cent of gross revenue to cover maintainence of way, structures and equipment from 1908 to 1914, shows that the company has undercharged operating expense by $277,059. This indicates that the net revenue has fallen far short of being adequate to keep intact the fair cost of the property put by the company into the public service.

SERVICE AT LESS THAN COST

Considering the low dividends paid from the time of organization and the above lack of proper depreciation charges, the commission finds that the rate-paying public has been receiving service at substantially less than cost. At no time have the rates charged been adequate to meet the fair cost of the service, and as between investors and patrons, the patrons have had much the better of the bargain. Regarding the payment of even moderate dividends without taking care of depreciation, the commission says that there is a great practical difference between the payment of dividends averaging 4.35 per cent (no more, perhaps even less, than an investment rate on money, which tends to keep the corporation in some sort of credit), and the payment of dividends so in excess of the investment rate as to put the stock on a speculative basis.

FINAL TEST OF COMPANY'S FINANCES

From the charges against income the commission deducted the annual interest on the $125,000 excess replacement cost of the South Middlesex Street Railway; assumed that the deficits of the constituent companies were cancelled at the time of consolidation; deducted all payments to the Norumbega Park Company; reckoned 6 per cent as the annual interest on the floating debt; assumed that 20 per cent of the gross revenue had been expended yearly to meet the cost of maintenance and depreciation, and assumed that the company is entitled to an annual dividend of 6 per cent. On this basis there would still be an annual operating deficit of more than $34,500. Even if the estimated excess cost of power of $12,000 per year were deducted, the annual revenues would still be insufficient by more than $22,500 to pay 6 per cent on the stock. The application of the present arbitrated wage schedule would increase this operating deficit to a total of more than $67,000 per year.

INFLUENCE OF WAGE ARBITRATION

The immediate occasion for the company's application is increased operating expense, due to increased labor cost resulting from the award of the board of arbitration dated June 22, 1914. This award requires the company to pay for labor during the coming year about $37,000 more than for the same labor under the old rates, besides perhaps $8,000 more due to change of hours, etc. The award also provided for the payment of about $30,000 of retroactive wages. The commission accepts the award as doing no more than justice to the employees, and doubts not that the patrons of the company will likewise accept it and the consequent increased cost of transportation as a proper charge.

CONCLUSIONS LEADING TO RATE INCREASE

The commission concludes that without an increase of fares, earnings adequate for the payment of any dividend cannot reasonably be expected. Both justice and expediency require that capital as well as labor employed in the public service should have its fair living wage. As a broad proposition, it is in the public interest that railway companies should earn and pay such dividends as to keep their stock at or a little above par. Under present financial conditions nothing less than a dividend of 5 or 6 per cent would bring a carrier's stock, otherwise reasonably sound, up to a par value.

The commission states that the petitioner's request for a change of fares would, if allowed, give a probable increased revenue of about $110,000 a year. On all the facts, a schedule of fares showing an increase of probably not more than two-thirds of that amount is in the public interest and required in justice to the company. It is not unreasonable to suppose that some advance over original fares might now be necessary even upon the better paying lines if these had continued to be separately operated. While some increase may even be justified upon the lines where a 5-cent far is now charged, yet these lines should continue to enjoy a somewhat more favorable rate than the remainder of the system.

The commission believes that its award, as outlined in the opening paragraph of this abstract, is just and equitable as between the different communities involved, and will cause as little hardship to patrons as any scheme that can be devised to provide the additional revenue to which the company is entitled. The schedule approved, with rigid economy—which includes the purchase of power on more advantageous terms—will enable the company to obtain sufficient revenue to maintain its property in safe and sound condition, expending for maintenance and renewals, until some general basis for dealing with depreciation is ordered or indicated by the commission, substantially 20 per cent of its gross revenue, and also to provide for the paying of moderate dividends.

European Public Utilities

Effect of Present War on European Capital and Engineering —British and German Tramway Statistics

W. J. Clark, of the General Electric Company, presented an address on European public utility conditions at the Public Service Railway section of the American Electric Railway Association at Newark, Oct. 29. He said that he would have to describe the conditions before the war, as no one can foretell the radical changes which must come to both the engineering profession and public utilities as a result of the destruction now going on in Europe.

Contrary to the general supposition, a great portion of the European public utilities, except the government-owned railroads, telegraph and telephone systems, are controlled by European international capital, instead of being owned within the countries where such projects are located. This plan, which has also been followed the world over, explains to a large extent the dominating position of the European countries in foregn trade. It is impossible even to approximate the total of such European investments, but recently the earnings from those of the United Kingdom have been estimated by economists to be about $600,000,000, while the combined similar investments of Germany and France have been estimated at approximately the same amount. Looking to the future, it is but logical to suppose that European countries must dispose of many such investments to secure the necessary capital to replace that which is being destroyed in Europe, while the bonds which have hitherto bound European international capital together have doubtless been severed.

The disastrous future effects of the present war will be marked upon European engineers and engineering, because probably more than 75 per cent of all of the active engineers in Europe are now in military service, and this includes, of course, the flower of the profession. The casualties in the engineering regiments have been greater than in other branches of service. In one regiment which went to the front over 1700 strong, there are now less than 180, and in another which mobilized at 2200 less than 350 remain. If the present terrible condition continues, seemingly before the European engineering profession can regain its former numerical strength and efficiency, another generation must be so educated and acquire its practical engineering experience.

Statistics on European Tramway Enterprises

Statistics on European tramway enterprises as existing before the war are difficult to compile and compare. They differ greatly in character and extent, and in no two countries have they been compiled on the same basis. Heretofore, Belgium has been the headquarters for a number of the public utility holding companies because of its supposed neutrality.

A comparison of the wages paid on tramways in America and Great Britain show that the British wages are about half of the wages paid in this country. From this it is obvious that if American rates were paid in Britain its tramways could not meet their fixed charges. On the other hand, if British wages of labor prevailed here, our street railways could be operated at about 30 per cent of their gross receipts or other equally surprising things could be accomplished. In spite of this fact the roads as a whole are not a commercial success. The total capital investment in the British and municipally-owned tramways is $246,493,034, and after the payment of interest and fixed charges, the deficit from operation last year was about $660,000. This unfavorable showing is made greater by the fact that less than 2 per cent on the investment was charged in operating expenses to depreciation and renewal funds.

According to the British Municipal Year Book of 1914, as regards England and Wales: "In 1912-1913, the sums transferred in aid of rates from the accounts of electricity and gas supply undertakings, harbors, docks, piers, canals and quays, tramways, light railways and water works, was £41,000. The total of the sums transferred from rates to meet deficiencies in the accounts of such undertakings was £151,000.

German Statistics

The conditions in Germany are described by Dr. Richard Passow as follows: "Out of thirty-six municipal street railways in 1908, nine were operating without profit. Further, twelve showed that some financial assistance was required from the municipality, partly due to the extensive number of employees and administrators appointed by the state authorities."

Quite complete German tramway statistics are available, and the following is a translation of the summaries shown by them.

Statistics on Street Railways in Germany—1912

	Company Plants	Municipal Plants	Total Municipal and Company
Length of track (kilometers):			
On street	3,113	1,785	4,898
On private right-of-way	368	156	524
Total	3,481	1,941	5,422
Number of employees	30,470	17,278	47,748
Rolling Stock:			
Steam locomotives	59	5a	64
Electric locomotives	25	22	47
Number of passenger cars	13,331	8,650	21,981
Total all cars	15,284	9,199	24,483
Total seating and standing space provided in passenger cars	457,821	310,644	768,465
Average carrying capacity per car	.....	.....	35
Passenger car kilometers	433,831,507	306,188,099	740,019,606
Number of passengers carried	1,526,153,644	1,203,072,641	2,729,226,285
Cost of erection (marks)	768,590,580	394,501,728	1,163,092,308
Invested capital (marks):			
From government	11,371,803	1,694,600	13,066,403
From province	3,653,467	10,501,250	14,154,717
From county	16,625,237	9,538,312	26,163,549
From parties interested	28,641,396	352,912,372	381,553,668
From other sources	733,998,230	50,807,694	784,805,924
Total invested capital	794,290,133	425,454,228	1,219,744,260
Passenger receipts (marks)	162,114,210	130,054,929	292,169,139
Freight receipts (marks) / Postal receipts (marks)	1,523,784	162,638	1,686,422
All other receipts from railway service	7,070,574	2,001,924	9,072,498
Summary of receipts	170,708,568	132,219,691	302,928,259
Summary of expenditures	106,483,296	75,008,146	181,491,442
Allowance for depreciation	8,409,636	6,634,409	15,044,045

Note: "a," gas locomotives.

The following is apparent from these statistics:

About 36 per cent of the trackage is government owned. The total trackage is approximately 14 per cent of the similar length of line in the United States. The number of cars is equivalent to 26 per cent of those in this country, but the average carrying capacity of the German cars is but thirty-five, whereas such average in this country is about double that figure.

The number of passengers carried is equivalent to 22.5 per cent of those carried in the United States. The total passenger receipts are the equivalent of $73,042,285, equal to 14.7 per cent of those in this country. The total operating revenue is equivalent to $75,932,065, or 13.5 per cent, of the similar item in the United States.

Operating expenses are almost exactly 60 per cent of operating revenues. The passenger car-miles run are approximately 462,515,000, equivalent to 24.5 per cent of those run in America.

Officials of the Louisville (Ky.) Railway were hosts recently to the members of the Louisville Engineers' & Architects' Club at an inspection of the new shops and a new power station of the company, which have been put into operation.

COMMUNICATIONS

Operation by Signals Preferable to Train-Order System

SCRANTON & BINGHAMTON RAILROAD

SCRANTON, PA., Nov. 4, 1914.

To the Editors:

In response to your request for an explanation of the points raised in Mr. Handshy's communication (published in last week's issue) I might say that the duties of trainmen, under our system of operating by signals alone, have been very much simplified. The elimination of the complications of the train-order system, with its tax upon the memory and its necessity for experience in interpretation, has, to all intents and purposes, reduced our procedure to that figuratively outlined in your editorial of Oct. 3.

The question as to what is done when a signal failure occurs may best be answered by quoting from our standard book of signal rules as follows: "When a train is stopped by an automatic signal that is evidently out of order, the motorman, ... after waiting five minutes, will proceed at a speed not to exceed 8 m. p. h., being prepared to stop within one-half his range of vision until he has reached the next proceed signal, expecting to find a train, open switch, broken rail or other obstruction on the block. At curves, or during fog or other weather conditions that obscure the view, the conductor must go ahead of the train far enough in advance to stop, within a safe distance, any opposing train."

You will understand, of course, that the direction indicator, which is located some 200 ft. in advance of each siding home signal, will not give its proceed indication in case an opposing train has entered the block in advance of the defective signal. Therefore, the train which proceeds under the above rule is not confronted with the possibility of advancing against a high-speed opposing movement unless both the signal and the direction indicator fail at the same time—a contingency that is so remote as to be a practical impossibility.

The possibility of false clear indications, to which Mr. Handshy refers, was, of course, thoroughly investigated before our signal system was adopted, and we consider that the combination of intermediate signals and direction indicators which has been installed constitutes as perfect a check against head-on collisions due to false clear indications as can well be conceived in the practical art of automatic signaling.

As a matter of fact, we have had no clear failure as yet, although it may be that we shall have one some day. However, clear failures in general are of such rare occurrence as to be of the order of one per 1,000,000 movements, and, on at least one line equipped with Union Switch & Signal Company's apparatus (as is also the Scranton & Binghamton Railroad) clear failures have happened only once in about 60,000,000 movements. Consequently, they cease absolutely to be worthy of special consideration when, to be dangerous, they must occur in conjunction with abnormal failures of several pieces of apparatus at exactly the same time. In addition, since it is necessary to have cars in certain narrowly defined positions before a collision can occur, even when there is a clear failure of a signal as well as all of the checks upon its operation, the odds against the contingency rise practically to infinity. To be perfectly frank, I consider the signal system on the Scranton & Binghamton to have safeguards and checks which are considerably more effective in practice against dangerous false clear indications than would be the check provided by train orders.

R. W. DAY, General Manager.

Methods of Calculating Depreciation

PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CAL., Oct. 21, 1914.

To the Editors:

I have read with much interest the article on "Depreciation" by Ralph U. Fitting, published in the ELECTRIC RAILWAY JOURNAL of Sept. 26, and believe that Mr. Fitting's very complete presentation of various classes of depreciation and the methods of computing allowances to meet depreciation will assist very materially to a better understanding of this very complex question.

In following the discussions of this subject that have appeared from time to time, and in talking to many who are interested in the financing and operating of public utilities, it has seemed to me that there is a very evident tendency to take the depreciation question too seriously, that the theory of depreciation is being allowed to cloud the issue, and that we are losing sight of some very practical and commonsense facts.

We have at the present time two separate, although related, problems involving depreciation:

1. Accrued depreciation and its effect on value.
2. Deduction from revenue to take care of property retired from service.

In discussing the first problem we find many arguments, theories and illustrations used both pro and con as to how the accrued depreciation should be considered in valuing property and, as far as I have been able to analyze the attitude of mind of those presenting the different sides of the question, the real difference lies in a fundamentally different conception of depreciation. I believe that, expressed very generally and briefly, these conceptions are:

(*a*) Depreciation is a part of the value of the property which is being taken away from the property, just as the coal taken out of a coal mine is a part of the value of the mine being taken away.

(*b*) Depreciation is nothing more nor less than an accounting method of equalizing the cost of replacing and retiring property over a long period of time in order to avoid distorting the operation and maintenance accounts in any relatively short period.

The first theory loses sight of the fact that a public utility property is not a simple structure that is here to-day and gone to-morrow, but is a complex structure that is permanent in its function and existence.

The second theory holds that as long as an existing property is giving the equivalent in service and efficiency of a new property there is no depreciation in value beyond some possible deferred maintenance. It must, of course, be admitted that there are some cases where this will not hold true, but for a normal healthy public utility I believe this theory to be the correct one.

The computing of the proper amount to be set aside, out of earnings, to meet the retirements of property from time to time is, as Mr. Fitting points out, difficult, but I cannot agree with his conclusions that the percentage of gross earnings method is the best. It seems to me self-evident that while we may perhaps for some particular property hit upon a percentage of the gross earnings that will fill the requirements, this same percentage in some other property would not be satisfactory. The useful life of the different parts of a property is a function of the make-up of those parts and has nothing to do with the earnings. We may not now be able to estimate exactly the proper percentage

of the value of the various classes of property to put aside, but it should be remembered that a public utility is made up of many classes of property, and while we may overestimate the percentage on one class we in all probability will underestimate the percentage on other classes. It is only by experience that we shall be able to determine the proper percentage, and if we continue on an arbitrary method based on earnings we shall never be any wiser than we are now. On the other hand if we base the annual allowance on percentages of value and use every effort to compile data for checking and revising these percentages, we shall be able, as time goes on, to determine from actual experience with a greater degree of accuracy what these percentages should be.

John A. Britton,
Vice-President and General Manager.

Insert Special Work Failures

Omaha & Council Bluffs Street Railway
Omaha, Neb., Oct. 17, 1914.

To the Editors:

Having read carefully the interesting articles in your issues of Sept. 19 and 26, I state below a few observations we have made in the construction and maintenance of special work of the hard-center type.

Most of our experience has been with the 7-in. type, made up of iron-bound 107-lb. and 108-lb. girder guard sections. We also have some of 97-lb. section, and all are fitted with manganese centers of various types. About two years ago we adopted the practice of using 6-in. x 8-in. sawed white-oak timbers of different lengths, as a support for all special work in paved streets. On the special work blueprint we locate the ties most advantageously and use different lengths as needed to give the steel proper bearing on the foundation. This facilitates tamping as compared with the old practice of weaving a number of 7-ft. ties throughout the layout. Such practice sometimes made it impossible to tamp the ties solid at points where proper tamping was absolutely essential. Moreover, a much stiffer foundation results at only a slight increase in cost, when special ties are used, and tamping is more easily accomplished.

Our sub-grade is generally of hard yellow clay, and with a 6-in. bed of well-tamped crushed rock under our ties, a very uniform bearing is obtained. Our drainage is good as the streets all have considerable grade. Wherever the sub-soil is of poor quality, as, for instance, where fills have been made, we use a combination construction consisting of a 6-in. concrete slab on which we surface the switch ties with 2 in. of stone screenings.

In handling iron-bound special work we use an electric crane and usually make the installation at night. We stake off the work accurately so that the steel may be installed, spiked and bolted to line without necessitating the strenuous use of screw jacks and drift pins to obtain alignment after the layout is in place. The use of screw jacks and drift pins in pushing and drawing frogs to line is, no doubt, very injurious to iron-bound construction. We find it necessary, however, to use jacks occasionally in lining, but this is done under very careful supervision. Drift pins must be used also to bring joints together, but only for a slight movement of the frog with spikes loosened. This does not entail harmful results. We find it important, when bolting up the splices, to have all joints drawn tight. After the installation is complete the surfaces of all joints are ground smooth. We believe grinding will add to the life of the joints and in turn to the special work as a whole.

Our loose-center trouble is confined almost wholly to 90-deg. crossings. We have had some trouble with the centers in curved crossings after having been in use several years, but the most serious trouble exists with the 90-deg. type of crossing, of which we have a great many. Present-day cars, which weigh from 18 tons to 22 tons empty, cross over flangeways in center plates 1⅜ in. wide every two or four minutes, exert considerable lateral thrust on plates and make the problem of special work construction and installation increasingly difficult. We have found on 90-deg. crossings that an entire spelter bed for the plate soon settles and excessive pounding results which ultimately breaks down the foundation. Some of our centers are set on lead slugs before pouring the spelter. These do not stay to surface as well as those with either a partially machined bearing or those set on steel shims before pouring. We also find that unless a hard-center plate has a tight fit at all four points where it joins the arms, it will not stay tight for any reasonable length of time.

Another serious condition to meet, which affects our hard-center maintenance, and is mentioned in the article, is the thin-flanged steel wheel. Our cars are all of the single-end type, the operation of which tends to cause unusual wear of wheel flanges. A continuous crowding of one rail (usually the inside) results in one wheel flange wearing thin, while the opposite wheel develops what might be called a double flange. When they strike a hard center the wheels must be pulled over at the flangeway. This throws a lateral strain which, on any hard center of present design, must be resisted by the spelter-filled edge. We have noticed that the manufacturers do not always carefully provide for such a condition. In grinding flangeways, care should be exercised to make the approach to the narrow throat of the hard center as easy a transition as possible, even though it might mean an increase in the size of the manganese plate.

Rail arms in iron-bound 90-deg. construction should not be longer than 4 ft. We find in some cases that longer arms up to 6 ft. or 7 ft. have been provided in the past to meet existing joints. In these the compromise joint weakens sooner or later, and if this is not detected at the time of slight movement, an excessive bending moment will occur at the casting which it cannot resist, and a rupture occurs. In order to reduce difficulties to a minimum we employ special repairmen on joints and special work. As soon as a piece appears to be loose on its foundation it is promptly resurfaced. We endeavor to guard against any loose joints in special work and carefully inspect and repair it as soon as they are detected. A loose compromise or ordinary joint will allow a pumping action which causes the arms to cut into the tie and within a short time the arm is loose in the casting.

The comparatively new process of using the electric welder for building up special work intersections, seems to offer a most promising field for the development of a solution for hard-center troubles. The perfection of the qualities of the steel which can be welded to intersections will bring a demand for the use of the one which will successfully amalgamate with manganese centers. Perhaps the frogs themselves can be cast of some alloy other than manganese steel, to which the electric welding process may be applied satisfactorily. With this developed, the flange bearings and intersections could be readily kept in proper condition, thereby satisfying the public demand for less noise at intersections, and at the same time conserving the life of rolling stock.

F. H. Findley,
Superintendent Track and Roadway.

The Daily Report of the Convention

THE SOUTHWESTERN ELECTRICAL & GAS ASSOCIATION
DALLAS, TEX., Oct. 30, 1914.

To the Editors:

I have again been in prompt receipt of your convention daily issues and again wish to express to you my appreciation of these. The comfort, convenience and pleasure of having the daily proceedings of the convention "hot off the bat" at this long distance away should certainly be appreciated by those who are compelled to be absent from the convention, and it should also certainly be appreciated by those at the convention nearly as much as by the absentees.

I did not notice that the various associations gave you a vote of thanks for your enterprise in this matter, but they certainly should have done so and made it a "rising vote"! H. S. COOPER, Secretary.

Public Relations Number

Newspaper Comments on Our Convention Issue—General Approval Expressed

The two score of articles devoted to electric railway progress and improvement and the general subject of public relations, published in the convention number of the ELECTRIC RAILWAY JOURNAL, issued on Oct. 10 in connection with the annual convention of the American Electric Railway Association, were well received in the daily newspaper field, as shown by both reprints of many of the articles and editorial comment on them.

The articles in this number that were drawn upon for reprint material varied widely as to subject matter discussed, and the excerpts published ranged from single paragraphs in a few instances to solid columns in such newspapers and other publications as the Philadelphia *Public Ledger*, Chicago *Daily Tribune*, Boston *Evening Transcript*, *Wall Street Journal*, Rochester *Democrat*, Boston *Christian Science Monitor*; Grand Rapids *News*, Salt Lake City *Tribune*, *The Times Annalist*, Boston *Commercial* and many others. A few of the articles that received the greatest newspaper publicity were the following: "Proposed Co-operative Arrangement at Philadelphia," by A. Merritt Taylor; "Financial Relations Between Cities and Utilities," by Bion J. Arnold; "Electric Railroading in Utah," by Simon Bamberger; "Winning the Confidence of the Public," by Robert M. Searle; "Is Publicity a Cure-All?" by A. W. Warnock; "The Importance of Good Public Relations," by Theodore P. Shonts; "Improvement of Relations Between Electric Railways and Employees," by Charles W. Eliot; "Public Utility Regulation—A Cloud on the Horizon," by H. H. Crowell; "Five Years' Development of the American Electric Railway," by Frank R. Ford; "The Electric Railway and the Farmer," by John R. Graham; "Aspects of Rush-Hour Service," by E. C. Foster; "Local versus State Regulation," by Richard McCulloch, and "Co-operation in Transit Contracts," by Timothy S. Williams.

One of the most interesting features in connection with such newspaper publicity was the geographical distance which often separated the author of the article and the newspaper in question, showing that the ideas presented and not merely the personality of the author led to the abstracting of the paper. For example, portions of the paper of Richard McCulloch (St. Louis, Mo.) were published in New York; by A. W. Warnock (Minneapolis, Minn.) in Manchester, N. H.; by Jesse W. Lilienthal (San Francisco, Cal.) in Butte, Mont.; by Robert M. Searle (Rochester, N. Y.) in Camden, N. J., and Springfield, Ohio.; by E. C. Foster (Manchester, N. H.) in Paterson, N. J., and by Frank R. Ford (New York, N. Y.) in Boston, Mass. The remarks of Dr. Eliot (Cambridge, Mass.) were quoted in New York, Freeport, Me.; Newark, N. J., and Chicago, Ill., and other cities, while the article by John R. Graham (Bangor, Me.) reached Chattanooga, Tenn.

As examples of the editorial comment aroused by the above-mentioned and other articles, the following three have been picked at random. Referring to Dr. Eliot's article, the Chicago *Tribune* says:

"Some of these reforms are in actual operation in European countries. Some have been tried in this country with success. The combining of all of these measures into one system affecting and modifying the wage relations of to-day to the extent to which Dr. Eliot would have them modified, has not yet, however, been attempted. It may be some time before the American people are ready to consider Dr. Eliot's program. To the extent, however, that his suggestions stimulate serious thought about present industrial conditions, they are of immediate value and helpfulness."

The Brooklyn (N. Y.) *Daily Times* comments on Mr. Williams' article in part as follows:

"As Colonel Williams well points out, the danger exists and will continue to exist, that the commission in its desire to please local interests or to gain political advantage may lose sight of the great public function with which it is entrusted. For it must not be forgotten that, although somewhat crudely, we have, at least in an approximate sense, taken municipal affairs out of politics, while no such change has been effected in state affairs, and it is questionable if it ever will or should be.

"When a tremendous undertaking, such as the completion of our subway system, is discussed as rationally and intelligently as by Mr. Williams, and when the principles in such a transaction are so transparently clear and candid, there can be no doubt that we have reached in our own dealings with large transit problems an era and a condition that would have been pronounced the millennium a few years ago."

Concerning Mr. Taylor's outline of the Philadelphia program, the *Public Ledger* of that city says:

"Director Taylor's illuminating summary of the rapid transit program revives interest in the momentous proposition and serves to stimulate fresh interest in the approaching loan election. No other measure of city development has even been promulgated which will propel Philadelphia forward to the same extent. The more the plan is studied the more feasible it appears, safeguarding well the public's interest and justly caring for the rights of the transit company."

Association of Technical Associations' Secretaries

As announced in the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 31 a meeting of technical association secretaries was held in New York on that date, and an association was formally launched. The temporary organization will continue until the meeting which is to be held on some date between Jan. 1 and March 1, at which time the nominating committee will report a list of suitable nominations for the officers provided for in the adopted by-laws. The American Electric Railway Association was represented informally at the organization meeting by C. W. Stocks, statistician, and H. H. Norris, ELECTRIC RAILWAY JOURNAL, who attended in place of Secretary E. B. Burritt. An important feature of the work of the new association will be the distribution of information regarding convention dates and places of technical societies. It is expected also that the getting together of representatives of the societies will be helpful in preventing duplication of work and in enabling the secretaries to benefit by each other's experiences.

Equipment and Its Maintenance

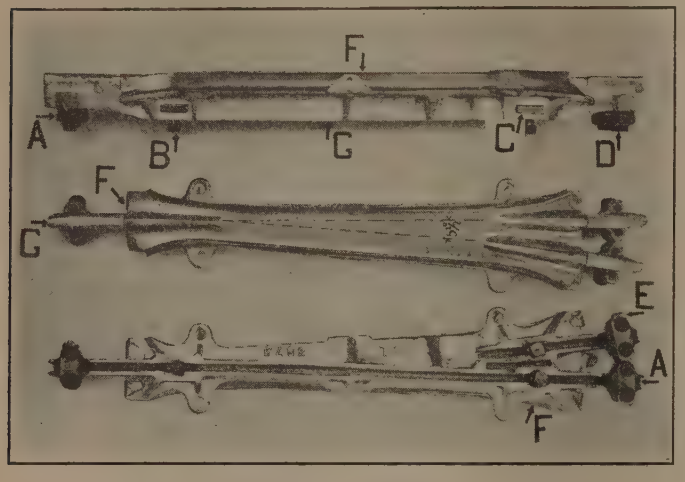
Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

A Method for Locating the Correct Position of Overhead Frogs

BY ROBERT D. DIXON, MAINS SUPERINTENDENT NEW SOUTH WALES GOVERNMENT TRAMWAYS, SYDNEY, AUSTRALIA

Of the various fittings used on overhead construction for tramways and street railways, none has been the cause of more trouble than the frog. From the earliest



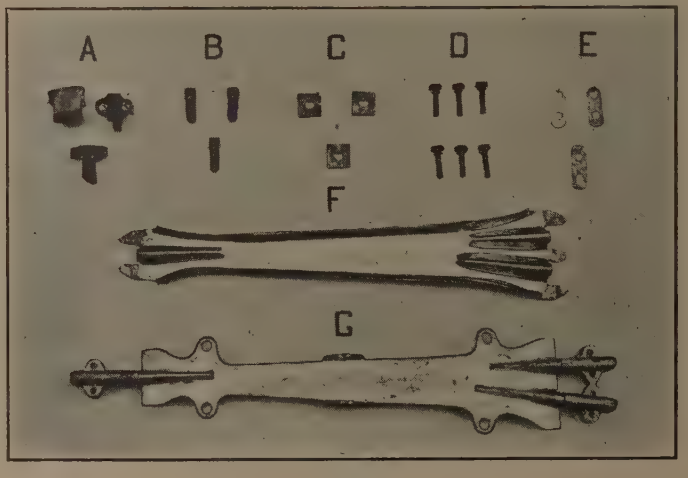
SYDNEY TRAMWAYS—ASSEMBLY OF FROG

days, when the angle between the tongue containing the branch trolley wire and the tongue on the main line was 45 deg. down to the present time when this angle has been reduced to about 6 deg., the frog has been a fruitful source of annoyance. In the infancy of electric traction the pole, more frequently than not, left the trolley wire when taking the turnout. Even when the car took the frog at a snail's pace, the conductor had to hold the trolley rope, so that the pole might be placed on the wire after refusing to travel in the required direction.

As it became necessary to increase the speed of cars at junctions, so the limitations of the frog, as first designed, became more exasperating. The angle between the tongues was gradually reduced, with a corresponding decrease in the number of poles leaving the line. When the angle had been reduced to 9 deg. the length was greatly increased, and the weight of the frogs, which were of gunmetal, became excessive. In order to reduce this angle still further the frogs were made of an aluminum alloy, but the wearing parts were protected with thin steel plates.

These frogs gave very satisfactory results, but, together with all other previous designs, they had a serious disadvantage, as the whole frog required removal when the tongues and sides had become worn out. It was, therefore, necessary to evolve a new design in which the body, or backing, of the frog is made of an aluminum alloy (aluminum 98 per cent, copper 2 per cent), and a pressed-steel plate comprising the bottom, flanges and tongues is attached to the aluminum body. All the wearing parts are thus made of steel. When the frog requires renewal all that is necessary is to remove the old pressed-steel plate and attach a new one. The saving of time and money, as well as the reduction of interference with traffic, with this type of frog is of the greatest importance. It has also the advantage that when the frog is once correctly set the renewal of the steel plate does not in any way affect its position.

As far as the author can learn, a satisfactory method for accurately locating the correct positions for leading frogs has not yet been developed elsewhere. It has been seriously stated that the best method of locating frogs is to run a car on the branch line while leaving the trolley wheel on the wire over the straight track, the point where the wheel leaves the straight wire determining the position for the frog. Another method is given as the center of the triangle which is formed by the width of track at the points as its base, the apex



PARTS

A—Cast-iron tongues *B*—Set screws *C*—Nuts *D*—Bolts *E*—Locking strips	Weight 3 lb.
F—Stamped steel plate	Weight 2 lb.
G—Aluminum body	Weight 5 lb.
Total weight	10 lb.

SYDNEY TRAMWAYS—DETAILS OF FROG

being the point where the outer rail crosses the straight. Such methods naturally do not give satisfactory results, especially in cases where the car travels at high speeds. The method adopted on the Sydney, New South Wales, system has for some years been in operation with most satisfactory results, and it is a very rare occurrence for a pole to leave the wire at a frog, even when the speeds are excessive.

Some years ago special measurements were taken of the radius of track, superelevation of both straight and branch roads, and the exact position of the frog (9 deg.) in cases where it was known that frogs had given very good results. From these measurements it was calculated that the angle made by the plane of the trolley wheel with the trolley wire was in the vicinity of 15 deg., with one particular type of car. When the new

type of frog (5½ deg.) was adopted, it was decided that its position should be such that the angle made by the plane of the trolley wire with the plane of the trolley wheel should be 11 deg.

The method of determining the position for the frog is as follows: Starting from the switch points, the superelevation (if any) of the straight track is measured at intervals of 5 ft. If the trolley wire be 19 ft. above rail level, and track gage 4 ft. 8½ in., the superelevation obtained must be multiplied by $\frac{19 \text{ ft. } 0 \text{ in.}}{4 \text{ ft. } 8\frac{1}{2} \text{ in.}} = 4$. This would then give the theoretical offset in which the trolley wire should be placed on the straight track. However, as trolley wheels are not invariably placed in the same plane as the trolley pole, an additional offset of 2 in. is allowed, so that when a car is taking the straight track the trolley wheel tends to hug the guiding flange of the frog. When making allowance for superelevation it must be borne in mind that the car wheels are in advance of the trolley wheel, and that the superelevation of the track at the car wheels affects the position of the trolley wheel at its point of contact with the wire, which, in the case of a four-wheeled truck, would be about 11 ft. to the rear of a point vertically over the truck center.

Again, starting from the points, measure the superelevation on the turnout at intervals of 5 ft. Owing to the pivotal point of the trolley pole on the car roof—more especially on double-truck cars with the trolley pole in the center of the car—not being vertically above the center of the track, measurements must be taken to ascertain this offset. The easiest method is as follows:

The distance between truck centers being known—say, 22 ft.—the tape is run out to 22 ft. and placed as a cord across the arc made by the rail, and the versine measured, the tape being moved forward 5 ft. after each measurement is taken. To these figures must be added the offset of the pivotal point of the trolley pole due to superelevation. The superelevation of the track is, in this instance, not multiplied by 4, as the height of the pivotal point is not 19 ft. 0 in. above the track, but, say, 11 ft. The superelevation must, therefore, be multiplied by $\frac{11 \text{ ft. } 0 \text{ in.}}{4 \text{ ft. } 8\frac{1}{2} \text{ in.}}$, or 2.34. These measurements thus give the curve traced out by the pivotal point of the trolley pole as the car takes the curve. The horizontal projection of the trolley pole in use on the Sydney system is about 11.4 ft. with a trolley wire height of 19 ft., and it can readily be seen by reference to the diagram that all that is now necessary is to lay down on the track the position of the trolley wire on the straight track and the position of the curve traced out by the pivotal point of the trolley pole, fix the point where the distance between them is 2.19 ft.—which is the base of an isosceles triangle having for its two sides the horizontal projection of the trolley pole (11.4 ft.) the angle included between them being 11 deg.—then measure 11.4 ft. back toward the switch points, which gives the position of the frog.

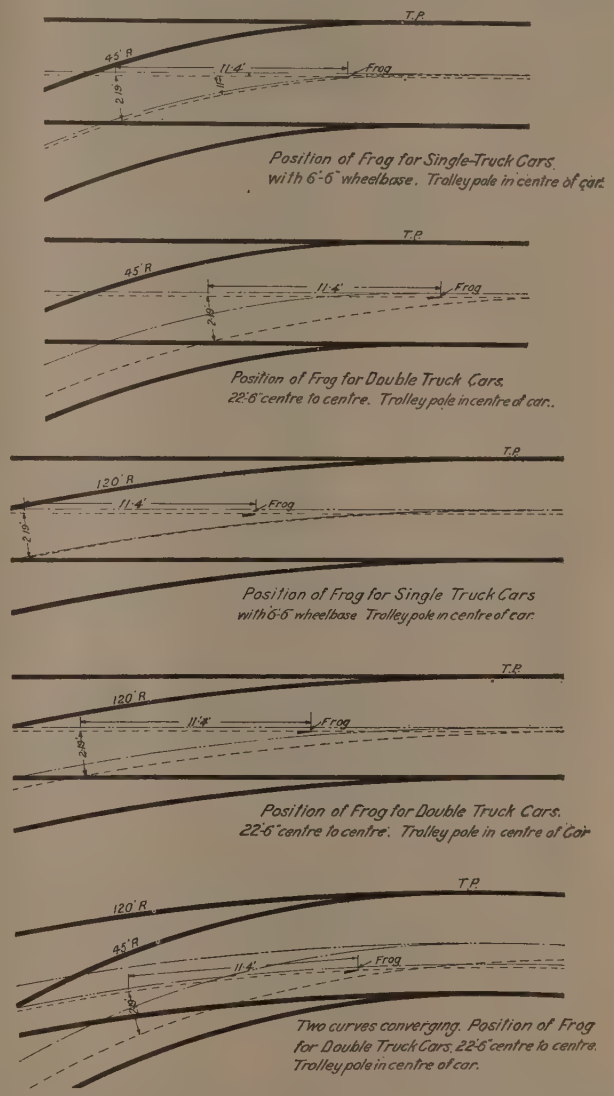
The explanation of the method takes longer to write than does the whole process of the location of the frog on the ground. When the engineer has become proficient in the work of setting out frogs, the operation should not take more than a few minutes.

Owing to local conditions the superelevation is occasionally the reverse of that ordinarily experienced, and the engineer must make allowances accordingly.

The most difficult frog to set in its correct position is that at the junction of two curves which are converging. (See diagram.) In this case the straight tongues are set for the track having the curvature of larger radius, and the branch tongue for that of smaller radius, The position of the frog on the curve of larger radius is on the trolley wire curve, as shown in the writer's article, published in this journal on May 7 last, except that the additional offset of 2 in. is given, as before mentioned, for the purpose of forcing the trolley wheel to bear against the guiding flange. Its position in relation to the curve of smaller radius is determined as before.

It will be noticed from the diagram that the position for the frog with a four-wheeled car with trolley pole in center of car is considerably in advance of the position in which it would be placed for a double-truck car with the trolley pole in the center of car.

In the case of a very sharp curve, the position for the frog is sometimes at a spot before the points are


T.P.
45' R
11.4'
Frog
2.19'
Position of Frog for Single-Truck Cars with 6'-6" wheelbase. Trolley pole in centre of car.
T.P.
45' R
11.4'
Frog
Position of Frog for Double Truck Cars. 22'-6" centre to centre. Trolley pole in centre of car.
T.P.
120' R
11.4'
Frog
2.19'
Position of Frog for Single Truck Cars with 6'-6" wheelbase Trolley pole in centre of car.
T.P.
120' R
11.4'
Frog
2.19'
Position of Frog for Double Truck Cars. 22'-6" centre to centre. Trolley pole in centre of Car
T.P.
120' R
45' R
11.4'
Frog
Two curves converging. Position of Frog for Double Truck Cars. 22'-6" centre to centre. Trolley pole in centre of car.

SYDNEY TRAMWAYS—FROG LOCATIONS FOR DIFFERENT COMBINATIONS OF CARS AND CURVES

reached. As the radius increases the position for the frog moves toward the curve in advance of the points. If the turnout were always a true circular arc the position of the curve traced out by the trolley base could be tabulated, but in almost every instance it is a transition curve, and the most practical method is to measure the versine of a cord equal in length to the distance between the truck centers.

With the increase in distance between the leading and trailing tongues of the frog, it has been necessary to maintain the trolley wheels more carefully to insure

that the planes of the trolley wheel and trolley pole coincide. The carhouse foremen have a special tool for making the necessary adjustments.

It might be added that there are approximately 900 frogs on the Sydney system, and that at some of the busy junctions from 1200 to 1500 cars pass over the same frog during the period of twenty-four hours.

A Home-Made Anti-Straddler

BY K. A. C.

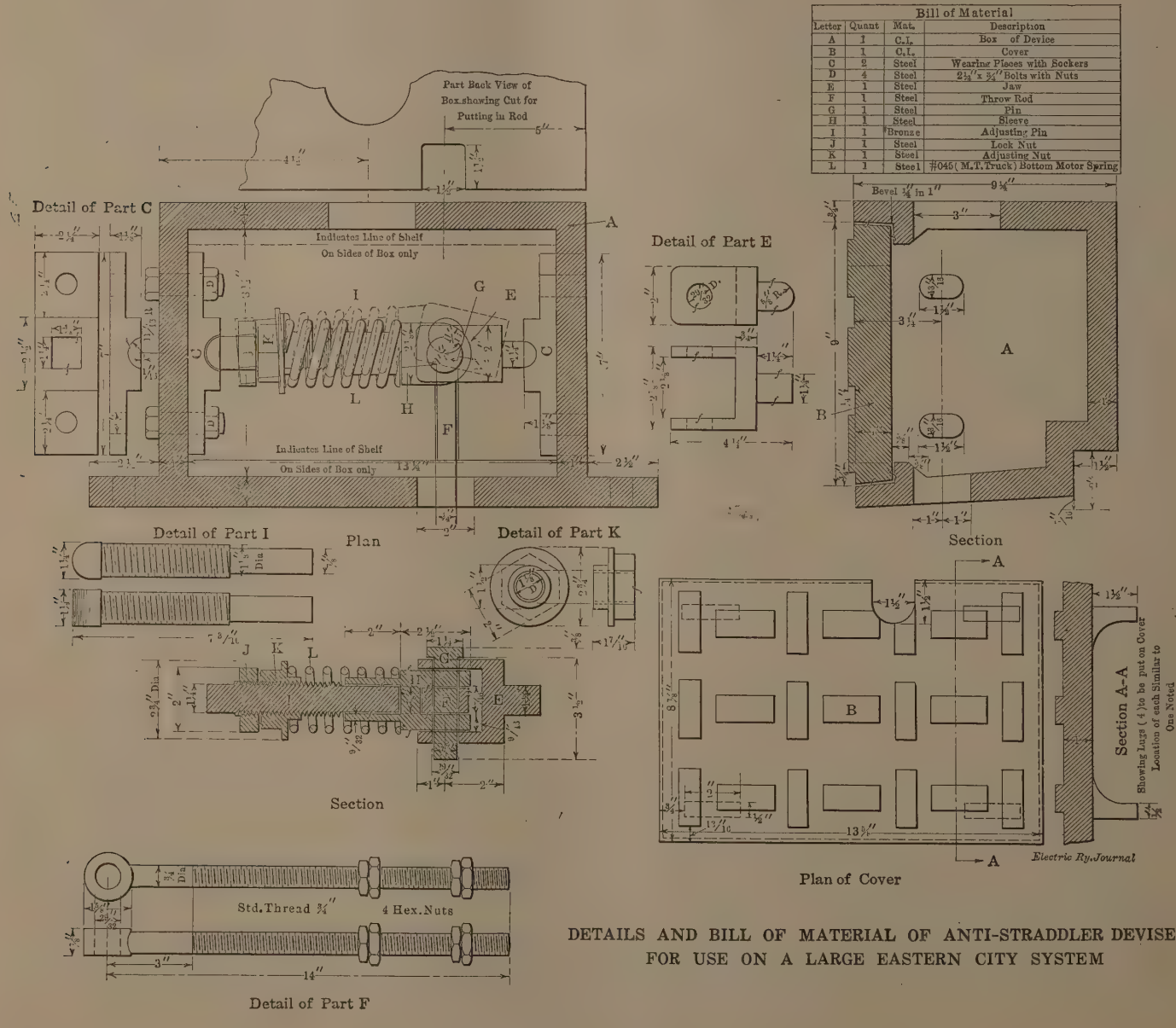
In electric railway operation no condition is so annoying to the operator as that met with in facing switches and generally known as "splitting." The causes for this are quite common and the results frequently disastrous. The accompanying diagram illustrates, in detail, a simple and effective preventive device recently adopted as a standard by one of the large Eastern systems.

Up to the present time this company has had in service numerous devices for the same purposes but all have been found deficient in some respect, some because they were too complicated and others because they were adapted to but one style of switch. After patient experiment with these contrivances it was finally decided to attempt the manufacture of one which would be simple and applicable to any switch in use, and the one herein described is the result. It has proved satisfactory under all conditions and is now in service generally, our own shops manufacturing all the parts.

This anti-straddler contains, exclusive of the box and bolts, nine parts, which are simple and strong, making renewals and repairs economical and easily performed. The parts *C* and *G* and *F* are the only wearing parts; the parts *I* and *E* which are bronze and steel respectively, resist wear to a very satisfactory degree.

The device can be assembled and maintained by an ordinary trackman. Drainage is obtained by means of a hole in the back of the box and consequently this particular requires little attention. All adjustments are made, after the original installation, by means of the nuts *J* and *K*, which are of steel on a bronze screw.

This device is not only an efficient anti-straddler but it can be applied to a spring or derail switch by lengthening or shortening the hold on the tongue rod *F*, according to which way the switch is to be set, so that the throw of the switch will not pull point *X* over center. The different styles of lugs can be cared for by fashioning this rod. The box will fit any of the numerous 9-in. construction switches in use. It can be entirely dismantled without removing any paving. The cover is so designed with lugs that it will remain stationary and be safe for horses and vehicular traffic, even under the most severe trucking.


Bill of Material
Letter | Quant | Mat. | Description
A | 1 | C.I. | Box of Device
B | 1 | C.I. | Cover
C | 2 | Steel | Wearing Pieces with Sockers
D | 4 | Steel | 2½" x ¾" Bolts with Nuts
E | 1 | Steel | Jaw
F | 1 | Steel | Throw Rod
G | 1 | Steel | Pin
H | 1 | Steel | Sleeve
I | 1 | Bronze | Adjusting Pin
J | 1 | Steel | Lock Nut
K | 1 | Steel | Adjusting Nut
L | 1 | Steel | #045 (M.T. Truck) Bottom Motor Spring
Part Back View of Box showing Cut for Putting in Rod
Detail of Part C
Indicates Line of Shelf On Sides of Box only
Detail of Part E
Bevel ¾" in 1"
Section
Detail of Part I
Plan
Detail of Part K
Section
Section A-A
Showing Lugs (4) to be put on Cover
Location of each Similar to One Noted
Plan of Cover
Std. Thread ¾"
4 Hex. Nuts
Detail of Part F
Electric Ry. Journal

DETAILS AND BILL OF MATERIAL OF ANTI-STRADDLER DEVISED FOR USE ON A LARGE EASTERN CITY SYSTEM

A Suggested Car-Mileage Meter

BY A MISSOURI CONTRIBUTOR

The system of keeping account of the number of miles a car has traveled by figuring up the number of blocks on the route does not seem to be a very accurate one because cars are sometimes switched from one line to another during heavy traffic. Also when trippers are used a few hours in the morning and evening a lot of figuring would be required, after six months of service, to tell how many miles the car had run.

I wish to suggest a system that would be accurate and labor-saving, namely, the use of a meter to register the number of miles traveled. If some manufacturer will put a meter of this order on the market it will do away with much clerical work by the railways. The meter should be made without any time attachment, as it is not wanted as a speed indicator, but it should register plainly the number of miles traveled—say, up to 100,000 miles or whatever other figure is desired.

Suppose a car is equipped with this meter. Then a card index can be kept with the names of the different equipment parts of the car, such as armature bearings, fields, motor bearings, etc. When the car is disabled or turned in the shop man, by referring to the card, will be able to see in a moment how many miles of service have been given by the part which has failed. After repairs, the number of miles shown by the meter could be recorded or the meter could be reset to zero. This meter need not be complicated or expensive.

Under-Water Coal Storage of Illinois Traction System

The Illinois Traction System has two large under-water coal-storage tanks, one located midway between its Peoria and Bloomington plants and the other close to its Riverton plant. The accompanying halftone shows the method of reclaiming coal from these storage tanks. This view was taken at Riverton, and illustrates the use of the company's wrecking crane for loading wet coal into the cars for transfer to the power-station bunkers. Briefly, this pit may be described as a reinforced concrete reservoir, 225 ft. long x 120 ft. wide x 20 ft. deep. Its walls and sides are of 10-in. reinforced concrete slabs protected with a waterproof

ILLINOIS TRACTION WRECKING CRANE RECLAIMING COAL FROM UNDER-WATER STORAGE TANK

coating. Along the middle of the storage tank is a timber trestle on which the coal cars are run for loading and reclaiming the fuel.

It is stated that the two coal-storage tanks have been very profitable investments. The Illinois Traction System has physical connection with more than 100 mines, and when fuel, especially screenings, can be bought at a particularly low figure, the coal-storage tanks provide capacity for economical under-water storage. This fuel is kept without loss in heat value until such time as a general scarcity of screenings arises and much higher prices prevail.

Detecting Defective Insulators

On the system of the Puget Sound Traction, Light & Power Company, of Seattle, Wash, M. T. Crawford, in charge of the transmission lines, has devised a convenient and rapid means for detecting defective insulators. The scheme was outlined briefly at the Pacific Coast meeting of the A. I. E. E. in Spokane, Wash.

TESTING LINE FOR DEFECTIVE INSULATORS

Recently the porcelain pin insulators used on one of the company's lines began to give a great deal of trouble. Investigation showed that the insulators do not usually have a large radial crack, but that a small crack starts on the head or in the side groove and extends around on the top of the insulator. These cracks enlarge until a leakage current starts through the top two or three shells and discharges over the surface of the lower shell. The tendency of a brush discharge to pass in the positive direction more than in the negative has a rectifying effect on the leakage current. This results in a unidirectional current from the bottom shell to the pin, and signs of electrolytic corrosion of the pinhead in the cement have frequently been found. Once started, this will soon crack the entire insulator, as the high tensile stress put on the porcelain by this internal expan-

sion will lower its dielectric strength. In many cases insulators have been found which were leaking noisily, and when the line was killed and an examination made the insulator was found intact, although a number of cracks were visible. As soon as the tie wire was removed, however, the entire insulator fell apart.

The expense of replacing all of the insulators was prohibitive, and the practice heretofore was to replace them one by one when the leakage became so great that it could be detected from the ground. As they were at an advanced stage of deterioration before this condition was reached, and frequently failed, causing an arcing ground that punctured other insulators, a heavy charge against maintenance resulted because of the emergency

LOCATING DEFECTIVE INSULATOR

nature of the repair work. In locating defective insulators at first, use was made of a megger, but unless the testing wire was over the leaking crack and this crack extended clear through to the pin, the result was unsatisfactory. After considerable experimenting, a device was perfected by which these insulators could be located at an early stage of the depreciating process. This enabled them to be replaced economically and before they finally broke down and damaged other insulators or interrupted service.

The device used for this purpose is shown on page 1065. It consists of a pair of 2000-ohm wireless-telegraph receivers fitted up for the convenience and safety of the inspector in testing. A hand pick is driven into the pole about 7 ft. from the ground, and a pin is driven into the ground several feet from the pole. The receiver set is connected between these two, and if all insulators are sound, there is a clear audible hum of the same tone as the telegraph line due to the shunting of a part of the capacity current of the insulators on the pole top. If, however, an insulator is leaking, a scratching noise is superimposed on the hum which comes and goes as the neutral shifts to and from the wire on the defective insulator. The inspector then climbs the pole and tests between each insulator pin and the center of the cross-arm and thus locates the defective insulator. The device can be used in a similar manner on steel tower lines. Insulators can be found in this way which have started only a very small crack and which will not puncture on the test below 100,000 volts. Insulators with a crack clear around the head were taken off and tested, puncturing at from 60,000 volts to 65,000 volts, but no sound was audible from them while on the line without the use of the detecting set. One or two lower petticoats were usually found intact, the leakage current passing over their surface during the test until the puncture point was reached. In the device used on the Puget Sound lines the hand pick consists of an insulated tube with a sharp-pointed steel terminal on one end which is thrust into the pole or cross-arm. The other terminal, which is driven into the ground or in the pole under the cross-arm in locating the insulator, consists of a sharp steel pin. A fuse and short-circuiting jack with plug on the receiver set is inserted in the circuit if there is any probability of a considerable voltage to ground.

A Cross-Seat with Rack and Quadrant

The name "Triumph" has been given by the United Electric Car Company, Ltd., Preston, England, to a new form of walkover seat, thousands of which have already been bought by several of the larger English tramways. The mechanism for operating the seat back is the special feature, as will appear from the following explanation.

The seat is carried on a tilter with angle corner stops on the upper side in place of the usual dowel pins, thereby permitting the seat to be easily fitted in position, even in the dark. On the bottom of the tilter is arranged a rack, which engages a quadrant carried on a stud. This quadrant is wide enough to engage with another quadrant which is secured on a solid steel shaft. A similar quadrant is fixed on the other end of the shaft and operates a similar mechanism, to insure the travel of the seat in a parallel direction. The back is carried on two short operating levers at each side, one

WALKOVER CAR SEAT WITH RACK AND QUADRANT MECHANISM

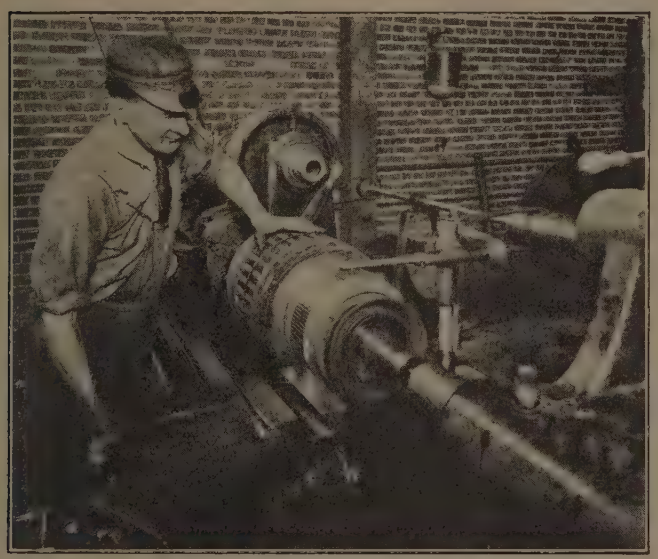
of these levers being fixed to the solid steel shaft, while the other is carried loose on a stud which also carries a quadrant. All the castings are made of the finest malleable cast iron and are set and drilled to jig so that all parts are interchangeable. The seats can be supplied in any type and upholstered in any kind of material. The invention is that of J. E. Anger, manager of the United Electric Car Company, Ltd., and patents have been taken out in England and other countries.

Actual Uses of a Double-Spindle Lathe

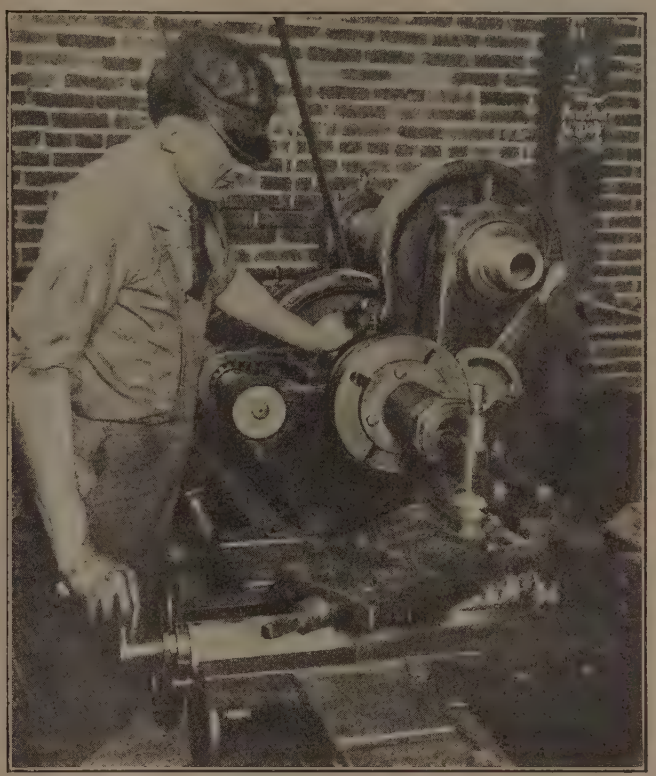
The "2-in-1" lathe with 26-in. back-geared and 48-in. triple-geared swing lathe, made by J. J. McCabe, New York, is a familiar object in many electric railway shops which are not large enough to keep specialized tools reasonably busy. Even the largest companies, however, find good use for this lathe. Thus one of the largest systems in the country uses three as stand-by wheel lathes in addition to handling miscellaneous jobs like the turning of piston rings for the power plants. Some of the possibilities of this machine were revealed recently in visiting one shop in Connecticut and another in New Jersey.

On the Connecticut railway the lathe handles the total repair input of eight sets of wheels a week in addition to a great variety of other work. If used for wheel work alone the lathe can turn out four to five pairs of wheels a day. When used as an ordinary lathe, the large faceplate is removed by means of a block and tackle overhead. This particular lathe is driven by a 7½-hp motor, the control and drive of which embody several commendable features. Thus the lathe movement is controlled from the center of the tool so that the operator does not have to walk over to the motor at the headstock every time he wants to throw the switch. The controller is covered with a wooden casing, which also protects the men from contact with the gearing. Formerly, the circuit breaker was mounted on the motor but it is now mounted on a column because in the old position the jarring of the lathe during the making of heavy cuts sometimes opened the breaker.

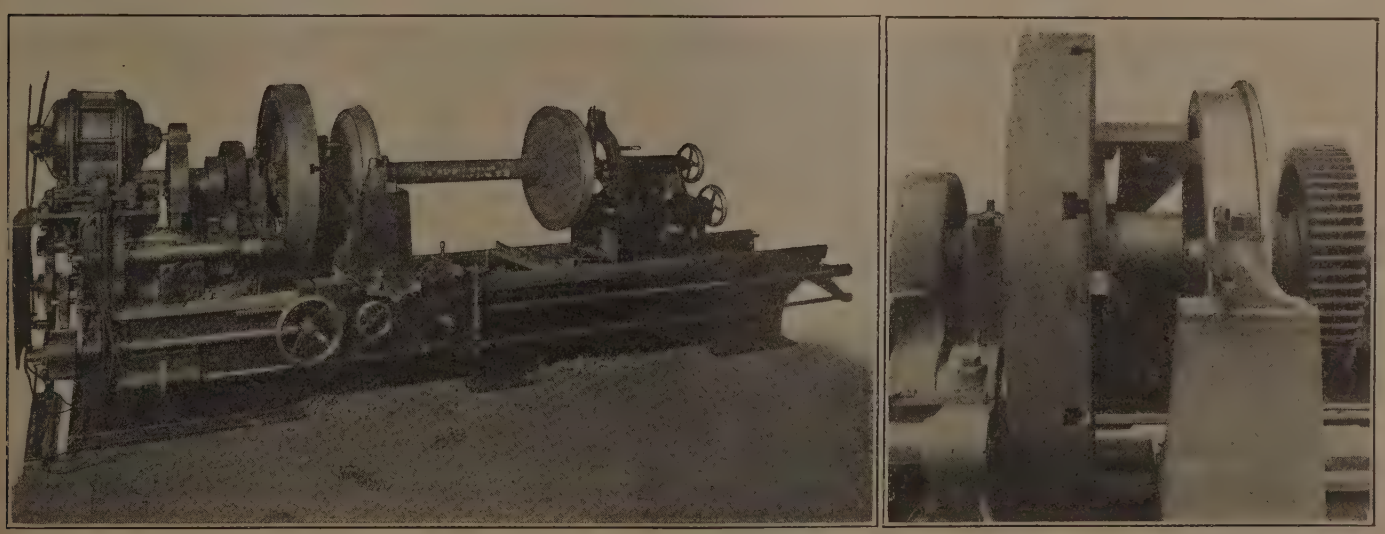
In the New Jersey shop the lathe is belt-driven. It handles anything from the turning of 34-in. diameter steel wheels to the boring of axle and armature housings and compressor cylinders. Among its special applications are threading bolts, making pipe couplings and crosshead keys and boring valve bonnets. This lathe, as adapted for slotting commutators, is shown in one of the illustrations. The frame for the shaft pulleys and idlers of the slotting drive is of heavy bar iron bolted to the base of the lathe. The saw arbor is sleeved on a vertical post with a stop for adjusting it to any desired height. The perfect alignment and the reciprocating movement of the armature are provided by its position in the lathe without the use of extra fittings.



COMMUTATOR SLOTTER ATTACHMENT IN USE ON A DOUBLE-SPINDLE LATHE



DOUBLE-SPINDLE LATHE IN SERVICE FOR THE TURNING OF ARMATURE BEARINGS



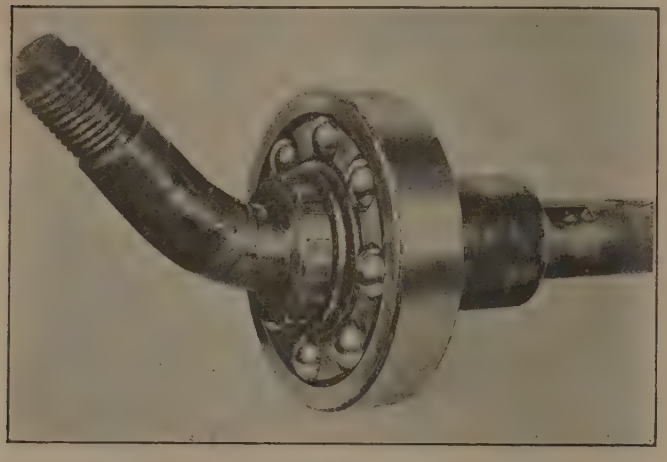
MOTOR-DRIVEN DOUBLE-SPINDLE LATHE SET UP FOR WHEEL WORK; WHEEL TURNING REST AND WHEEL-TURNING ATTACHMENT USED TO INSURE GOOD GRIP AND FREEDOM FROM CHATTERING

The same lathe may also be fitted with an emery wheel to grind flat spots on chilled iron wheels.

The maker calls special attention to the new wheel-turning rest and wheel-holding attachment illustrated in detail alongside the general view of the complete lathe. These changes improve the grip on the wheels, eliminating chattering and insuring uniform cuts.

Strength of Ball Bearings Proved by a Collision—Some Installations

The accompanying illustration is a striking example of what the standard S.K.F. No. 412 size ball bearings, now applied to electric railway motors and car lighting generators, will withstand. This is an armature shaft taken from a car lighting generator which has been in a wreck. The shaft, which was of 1½-in. flanged steel, was bent over the ball bearings as a fulcrum. From the illustration it will be noted that, although there is no crack in the steel at the bend, there is a double wrinkle



SHAFT BENT IN WRECK WITHOUT AFFECTING BALL BEARINGS

on the top side, which gives an idea of the great stress imposed upon the ball bearing when the wreck occurred.

Assuming a strength of 60,000 lb. per sq. in. a force of 23,000 lb. applied 3 in. in from the face of the bearing would be required to bend this shaft. As a matter of fact, each 1-in. ball would stand a crushing load of 97,000 lb. so even under such severe service as a wreck there is a good factor of safety for the ball bearing.

The car to which this generator was applied was a Santa Fé combination coach and mail car. The accident, which occurred on the Colorado Southern Railway tracks in Colorado, was caused by high water. The engine went through a culvert, with the baggage car on top of it and the combination coach and mail car crashing on top of that. The dynamo pulley was entirely broken up, only the hub remaining. The suspension of the dynamo, which was a Bliss type "O," was badly bent, and the generator frame was sprung out of round, so that two of the pole faces bound on the armature, causing trouble in removing it. The armature itself, which was mounted on two ball bearings, was not damaged in the least, and as soon as a new shaft was applied it was ready for service. Neither of the ball bearings showed any effect of their strenuous experience and have been returned to service. Both end housings of the generator covering the bearings were so badly broken that they had to be scrapped.

S.K.F. bearings are in use now on sixty-five cars of the Third Avenue Railway System, New York. Ten storage battery cars were equipped in October, 1910, with both journal and motor bearings, and in June, 1913, the company ordered thirty additional equipments. The excellent service which these bearings have given is emphasized still further by an order placed in September, 1914, for the equipment with journal bearings of twenty-five radial truck low-level trolley cars. The S.K.F. Ball Bearing Company has also recently furnished journal bearings for two Brill storage-battery cars of the Carolina Traction Company, Rock Hill, S. C., and for one Brill storage-battery car of the Cambria & Indiana Railroad, Colver, Pa. The last is a double-truck car operated at a schedule speed of 18 m.p.h., and the weight on the eight journals is fully 56,000 lb.

Combination Passenger and Baggage Side-Entrance Car

The Southern Iowa Traction Company has lately received from the American Car Company two 45-ft. 2-in. arch-roof interurban cars, as illustrated, which are unusual in combining the side-entrance feature with a standard passenger compartment, a smoking compartment and a baggage room. This design is 9 ft. wide over the sills and 9 ft. 4 in. over the trolley boards. A motorman's cab with hinged door is built in at opposite corners of the car. Four-leaf folding doors are used at the side entrance, a single hinged door is installed for each passenger compartment and the usual sliding door is provided for the baggage room except that the upper panels are of clear glass. The car underframe is of steel and wood while the sides are sheathed with steel. Each car is mounted on two Brill 27 M.C.B.-1 trucks equipped with four Westinghouse 323-A motors and K control. Other specialties on these cars are Nichols-Lintern air sanders, Hale & Kilburn reversible seating, Dayton sash fixtures, Ohmer registers and Peter Smith heaters. The two passenger compartments per car seat thirty-eight people.

SIDE-ENTRANCE CAR FOR SOUTHERN IOWA TRACTION COMPANY WITH ONE BAGGAGE AND TWO PASSENGER COMPARTMENTS

LONDON LETTER

Tramway Receipts and Extensions and Parliamentary and Civic Matters Are Reviewed

(From Our Regular Correspondent)

The effect of the war on tramway systems is reflected in the official returns of sixty of the principal tramway undertakings of the United Kingdom for the week ended Sept. 19. The report for this period shows total receipts of £226,838, or £7,747 less than in the corresponding week of last year. Receipts were at the rate of £79 4s. 7d. per track-mile, a decrease of £3 8s. as compared with last year.

The general manager of the Belfast Corporation Tramways has reported that since the outbreak of war the tramway receipts have decreased about £450 weekly, some 130,000 fewer passengers being carried. To meet this decrease he has been taking measures to arrange the tramway service week by week proportionately to the public requirements. He and his committee have received the support of the City Council to the steps so far taken.

The tramways department of the Glasgow Corporation has been able to resume the normal services of cars. Owing to the remarkably loyal response of the tramwaymen to Lord Kitchener's appeal for additional soldiers, the car service suffered considerably from the thinning in the ranks of the staff. In filling the vacancies married men who in ordinary circumstances were not eligible for the new army were selected first. Many of these men have since been trained for tramway work, and a full service is now available.

The Leeds tramways department is hurrying several pieces of work, with the object of providing employment for those who are out of work. The construction of the new tramway line at Guiseley will also be proceeded with, and a start is to be made with the erection of the overhead equipment for the railless cars which will run from the White Cross, Guiseley, through Otley to Burley. It is hoped also to begin the construction of the tramways extension from York Road to Halton.

The Leeds tramways department is hurrying several pieces recommended that the town clerk be authorized to make all necessary preliminary arrangements for the promotion of a tramways bill in the next session of Parliament. It is understood that the bill will include provisions for the extension of the tramways to Elland and to Stainland and for the operation of motor omnibuses to Ripponden and Cragg Vale. It may possibly be proposed to extend the tramways from the center of Brighouse borough to Rastrick. Nearly two years ago the ratepayers rejected a Parliamentary bill for these extensions and some street widenings in Halifax. Since then Huddersfield has taken trams to Elland, and Halifax traders have asked the tramways committee to construct lines to Elland and Stainland.

After a few tri-weekly performances, the experimental electric trolley bus at Hove has been withdrawn. It is understood that the vehicle has served its purpose for the time being. One of the objects of the experimental installation was to ascertain the relative efficiency of the over-running and under-running trolley systems in its bearing upon the scheme prepared by the Brighton authorities for the "through route" service.

As the result of the passing of the Bristol Corporation tramways bill, 1914, the corporation is prepared to work the local tramways if it exercises its power to acquire the property of the Bristol Tramways & Carriage Company. The tramways committee recommends that, before giving notice to purchase, it be authorized to negotiate with the company with the view of ascertaining what rent or other sum the company would be willing to pay to the corporation if the latter agreed to refrain from exercising its option of purchase for seven, fourteen or twenty-one years.

The tramway committee of the Edinburgh Town Council has discussed a draft minute of agreement between the Lord Provost, Magistrates and Council of Edinburgh and the Edinburgh & District Tramway, Ltd., and Dick, Kerr & Company, Ltd. (lessees of the Edinburgh Corporation Tramways). It is provided in the draft agreement that the corporation shall take over the rolling stock, cables and other plant used by the tramway company in working the tramways under the lease and that the tramway company shall sell and deliver the same to the corporation on the expiration of the lease, namely, on June 30, 1919, or at an earlier date if agreed upon between the parties. The tramways company is to continue to maintain and, where necessary, replace the stock during the lease. The price to be paid by the corporation on the transfer of the stock and effects is to be fixed, failing agreement, by an arbiter to be agreed upon between the parties or to be appointed by the Board of Trade. In fixing the price the contingencies of the cable system are to be kept in view, but without any consideration of good-will. It is further provided that the tramway company is to allow the corporation, free of charge, to experiment with self-propelled cars upon such portions of the present tramways as may be arranged between the two parties, the trials, however, to be so conducted as not to interfere with the ordinary working of the system. The tramway company is not to be responsible for any loss or injury through such experiments.

At the last meeting of the Edinburgh tramways committee a proposal was considered for providing a tramway to Queensferry. Two alternative routes are to be considered by a sub-committee.

The London County Council wishes to install the overhead trolley system in two streets in Stepney, but the proposal is opposed by the Borough Council, which desires the underground conduit system. In a report on the subject the works committee states that the Borough Council has most consistently adhered to the opinion that the only system of traction suitable for the two roads is the underground conduit system.

The London County Council has authorized a plan to bring before Parliament proposals respecting the establishment of a new electricity undertaking for Greater London. The details have not yet been submitted to the finance committee, but the draft was sanctioned in order that it may be dealt with without delay by Parliament. The proposals, roughly, mean a combination of municipal and private enterprise designed to insure full control by, and an adequate share of profits to, the public, with the flexibility and commercial enterprise of company management. The best features of both systems of working will thus be retained. The scheme involves the co-operation of the authorities in outer London with the London County Council, but no compulsory purchase of existing undertakings will be entailed.

The London & South-Western Railway has just issued £1,000,000 of preference stock, redeemable in ten years. The proceeds are required for the large electrification scheme which is being carried out on the company's Thames Valley suburban system. When the war broke out a temporary suspension of the work was ordered. The tracks are well advanced and the conductor rails have been laid over many miles of the first section of lines. The high tension distributing cables, carried on brackets on short posts alongside the railway, are also in position for long distances. The generating station, which is being erected at Wimbledon, is nearing completion and should soon be ready for the electrical machinery.

With regard to the extension of the electrical equipment of the London, Brighton & South Coast Railway, much of the electrical material hitherto has been secured from the Allegemeine Elektricitäts-Gesellschaft, Berlin, from which, of course, delivery cannot now be obtained. As is well known, this line has been equipped on the single-phase, high-tension system, the Berlin firm having been the contractors for the electrical portion of the work since the original electrification scheme some years ago. Nothing has yet transpired to indicate that any transference of the contracts for equipment will be made by the London, Brighton & South Coast Railway.

The ceremony of transferring the Kelham Island power station from the tramways committee to the electric light committee of the Sheffield Corporation has been formally carried out. The transfer was made as a result of a recommendation by a joint sub-committee of the tramways and the electric supply committees. All current supplied to the tramway feeders and for Board of Trade requirements, except certain booster units, is to be charged at the flat rate of 0.8d. per unit. This price is subject to a revision at the end of three years, and is based on the conditions already existing at the station and the present system of distribution.

A. C. S.

News of Electric Railways

INDIANAPOLIS LABOR SITUATION

Federal Court Injunction to Prevent Strike on Indianapolis Traction & Terminal Company

Hearings were held in the United States Circuit Court at Indianapolis on Oct. 27, 28 and 29, on the petition of the Guaranty Trust & Safe Deposit Company, Philadelphia, trustee under the mortgage of the Indianapolis Traction & Terminal Company, for an injunction to prevent W. D. Mahon, other officials of the Amalgamated Association and labor leaders in Indianapolis from attempting to induce trainmen to violate the award of the arbitration board made on Feb. 9, 1914, and go upon a strike, and to prevent the men individually and as a body from violating the arbitration award contract. At the close of the hearing Judge Arthur B. Anderson declared his intention to grant a temporary injunction, pending litigation.

A temporary restraining order was issued by Judge Anderson in this case on Sept. 23 when attorneys for the plaintiff appeared in the Federal Court and showed that an effort was being made by officials of the Amalgamated Association from Detroit to bring about a strike that night on the lines of the Indianapolis Traction & Terminal Company in violation of the award contract. This action was referred to in the Electric Railway Journal of Oct. 3, page 640. Oct. 2 was then set as the date of the hearing, but the case was postponed on request of attorneys for the union.

During the hearing nineteen persons were called as witnesses. The case against the labor leaders was presented in such thorough detail that practically no effort was made by their attorneys to controvert any of the facts by cross-examination of the witnesses, and this was commented upon by the court at the close of the arguments. Ralph Belch, business agent and secretary of the local, admitted on the stand that an affidavit signed by him, stating that twenty men were discharged by the company for the sole reason they were union men, was not true, and he asked the forgiveness of the court. Judge Anderson called the attention of the witness to the penalty for perjury and reminded him that the Federal grand jury met the following week. A long deposition of W. D. Mahon, international president of the Amalgamated Association, containing copies of correspondence between the officers of the local and officials of the Amalgamated Association at Detroit was entered as part of the testimony. It showed that appeals were made for a "leader" to come on and save the situation at Indianapolis, as men were continually leaving the union and signing the company's service contract, until now the company had more than 70 per cent of the men signed up.

The correspondence further showed that since last May plans had been discussed for calling a strike; that they were only seeking an opportune time, and that they now felt their last chance was slipping by. It was further shown that a drastic ordinance which had been passed on Oct. 19, 1914, by the City Council of Indianapolis, providing for thirty days' instruction for new motormen and conductors on both city and interurban cars by men who had been in the employ of the company at least one year, and providing a penalty of $300 a day for each man allowed to operate a car in violation of the ordinance, was prepared by Secretary Reeves of the Amalgamated Association at Detroit and sent to the local officers of the union to have put in shape by their attorneys and passed by the Indianapolis City Council. Mr. Latta, attorney for the plaintiff, showed that in the case of a strike it would have cost the company in penalties $100,000 a day to operate its cars, under the ordinance. This ordinance has since been vetoed by Mayor Bell of Indianapolis.

Edward McMorrow, member of the executive board of the Amalgamated Association, admitted that he called on the various labor leaders in Indianapolis and that he was to address the men at the midnight mass meeting on Sept. 24 which was interrupted by a United States marshal serving notice of the restraining order. He said to the men at the meeting that "there were some things I had intended saying which I can't now talk about." Being questioned by the court as to what they were, he declared they were in reference to the "wonderful benefits of membership in the Amalgamated Association, its insurance benefits, and many things too numerous to mention." Judge Anderson later remarked that there was no question but that Mr. McMorrow had intended to talk about a strike and nothing else. Mr. McMorrow admitted that he had advised the renting of vacant houses or other property adjacent to the carhouses for use as headquarters for bodies of men in case of a strike.

W. D. Mahon followed Mr. McMorrow as a witness. He admitted sending Mr. McMorrow to Indianapolis and that Mr. McMorrow reported to him and six members of the executive board at Chicago on Sept. 20. Mr. Mahon's testimony showed that the 50 per cent of the dues from the Indianapolis local received at Detroit had decreased from $626.50 in November, 1913, to $343.50 in September, 1914. During that time $9,000 had been expended on the Indianapolis local.

The question of the company's service contract was one of the principal subjects of argument. The attorneys for the union had filed with their answer a cross-bill asking for injunctive relief against the Indianapolis Traction & Terminal Company in what they claimed was a violation of the arbitration award contract. It was shown by Mr. Winter, counsel for the plaintiff, that as this cross-bill was brought by a co-defendant to a suit it had no validity whatever and could not be considered. The court expressed willingness to hear any evidence which might show that the individual or "service contract" was in violation of the award contract of the Public Service Commission, but attorneys for the Amalgamated Association said they did not care to submit any evidence but would argue the case.

The service contract was a result of the award of the Public Service Commission of Feb. 9, 1914, which contained a provision that each motorman and conductor should be permitted and required to be off one Sunday in each month, and that they should be permitted and required to have eight consecutive hours' rest between runs. The award also provided a minimum wage of $45 a month for extra men. Under these conditions the company found it impossible to take care of the extra baseball, park and theater travel on Sundays and holidays. The company therefore drew up a contract substantially in the same form as the arbitration contract, but with provisions which permitted car service men who signed this contract to work during all Sundays if they so desired, and providing eight hours rest in each twenty-four hours, but not necessarily eight consecutive hours between runs if the public service should at times prevent it. All the non-union men signed this contract and also many of the union men. In fact about 70 per cent of the men became parties to the modified contract. Officials of the Amalgamated Association had sought before the arbitration board, consisting of three members of the Public Service Commission of Indiana, to prove that the service contract was invalid and conflicted with the award contract in the agreement as to working conditions. The arbitration board held that the contract was valid in all provisions in which it did not conflict with the award contract, and that if the company succeeded in getting all the signatures of the employees to the service contract that instrument would then become effective in all particulars.

Judge Anderson, in the injunction hearing, held that the company was not in any way violating the award contract by securing signatures to the service contract, and that it was his opinion that the men who had not signed the service contract could not in any way interfere with those men who had signed it enjoying the privileges it provided; that it was very evident that the company could not secure all the names at once, and the fact that it had already secured 70 per cent, and was still continuing to secure signatures was very much in the favor of the company and could not be criticised.

Mr. Latta, in summing up the case for the plaintiff, asked the labor attorneys if they intended to rely on the Clayton bill in seeking to defeat the granting of an injunction by the court. Upon an affirmatory answer, Mr. Latta argued that the Clayton law was not applicable in this suit, quoting from Section 20, which provides that no judge may grant an injunction or restraining order in cases "between an employer and employees, or between employers and employees, or between employees, or between persons employed or persons seeking employment, involving or growing out of a dispute concerning terms or conditions of employment, unless necessary to prevent irreparable injury to property, or to property right, of the party making the application, for which injury there is no adequate remedy at law." It was shown that the plaintiff, the Guaranty Trust & Safe Deposit Company, is in none of the positions set out in the law, but is in the position of third party holding rights under a contract. The rights of the bondholders are involved, and there could be no adequate remedy at law because the Amalgamated Association (not being an incorporated body) and the other parties set out in the complaint could not make reparation for the damages set out as about to be sustained. Mr. Latta pointed out the unconstitutionality of the Clayton bill, in that under the constitution Congress has no authority to take away the power of the Federal Court, and it follows of necessity that Congress cannot take away the means of enforcing the power held by the court under the constitution. Judge Anderson in the remarks which he made following the argument concurred in this opinion.

Mr. Esarey, attorney for the Amalgamated Association, sought to show that the Federal Court could not enjoin further proceedings in the suit for receivership in the Marion County Circuit Court, in which William Dobson, secretary of the Bricklayers, Masons and Plasterers Union, is seeking to have the lease of the Indianapolis Street Railway to the Indianapolis Traction & Terminal Company cancelled. It was shown by depositions and testimony that five shares of stock were purchased by Mr. Dobson, after conference with labor union leaders, at the time of the strike in November, 1913, and the suit was brought and has been maintained in court for use in case of another strike, "to force the company to come to terms." Judge Anderson interrupted Mr. Esarey's argument by saying that such a suit could not be upheld in any court, and that he would not take time to discuss the matter, but that if he should think it necessary he would enjoin any such proceedings, and that it was his intention to issue such an injunction as would prevent "the raiders from the north—these citizens of Detroit" from interfering with the affairs of the company in Indianapolis.

Judge Anderson took exception to the closing argument of Frank S. Roby, one of the attorneys for the Amalgamated Association, in which Mr. Roby asked for an injunction against the company, intimating that such a decision should be made in answer to a demand by public opinion if an injunction was also issued against the men striking. The court said that if public opinion was represented by Mr. Roby it was founded upon a misapprehension so far as the evidence before him showed. "I think it is about time for us to take stock in the facts and not indulge in too much loose talk about public opinion," said Judge Anderson. "If I were manager of a property, I would discharge any man who stole from us; I would discharge a man if he got drunk; I would discharge a man for disobeying or violating rules—and the fact that he was a union man would not affect it at all." He said that the uncontradicted evidence showed that no man was discharged because of his union affiliations, and none was reinstated because he dropped out of the union. He said that the defendants themselves admitted that their charges to the contrary were untrue.

The temporary restraining order was then extended by the court for ten days, in order that attorneys for the defense might be given an opportunity to file briefs in connection with their cross bill for an injunction to prevent the company from putting its service contract into effect before it has secured the signatures of all the employees.

INJUNCTION GRANTED IN FRANCHISE CASE

The South Covington & Cincinnati Street Railway has been granted a restraining order by Judge A. M. J. Cochran of the United States Court at Covington, Ky., against the city of Covington to prevent its accepting bids for a new franchise over its streets. The court holds in short that the South Covington & Cincinnati Street Railway has a perpetual franchise in the streets of the city. While the order was not made permanent, it is believed that the final decree will not be different.

The movement to receive bids for a new franchise on the streets was inaugurated by former City Solicitor S. L. Blakely in behalf of the General Council and the company, in order to protect its rights, asked for an injunction. It asserted that receiving bids would work irreparable damage to its interests, cause the destruction of its rights and that it would be deprived of its property without due process of law.

The company contended that it owns a perpetual franchise on all the streets occupied, with the exception of the Rosedale line, and that the ordinance of 1864, limiting the street railway franchise granted thereunder to twenty-five years, was not of a general nature and applied only to the Covington Street Railway, which was referred to in the ordinance. When Council, therefore, enacted the ordinance of 1869, giving Mr. Abbott and others the right to construct and operate a railway on certain streets and made no mention of a date of expiration, with the exception of the statement that the grant shall terminate upon the failure of the company to construct its lines and operate its cars or fail to pay the annual stipend, it was the intention that no limit should be placed upon the right as long as these requirements were complied with fully.

Judge Cochran said that it is not necessary that the grant should state in so many words that it is perpetual. Among other things he said:

"Both in the ordinance of Dec. 13, 1869, and the contract of Dec. 23, 1869, made pursuant thereto, it was provided that the defendant (the city of Covington) granted Abbott and associates 'all the authority and right' that it had 'the capacity to grant.' We have seen that it had the capacity to grant to them a perpetual franchise. The provision, then, that there was granted all the authority and right that the city had the capacity to grant was the same as if it had said in so many words that it granted the perpetual franchise. The English language is not so poor that the same idea cannot be expressed."

The court further said that in 1882 the city granted the South Covington & Cincinnati Street Railway a franchise expressly stipulating that it was to operate under the Abbott grant.

NEW KANSAS CITY STATION OPENED

Kansas City's new Union Station was formally opened to traffic at 12:01 o'clock the morning of Nov. 1. A celebration was held on Oct. 30 and 31 which brought many thousand visitors to the city over the railroads and interurbans, and resulted in local traffic over the Metropolitan Street Railway which perhaps established a record. A feature of the celebration was an industrial parade by local manufacturers, with nearly 150 floats. The operation of cars on streets in the business district was suspended during the parade.

Some of the reroutings due to the opening of the station began Friday with the passing of one line through the station grounds. A new line was started which is called the station loop line. Other reroutings were established Sunday. These reroutings are the result of study by the members of the board of control, and were suggested by them to the receivers, who issued the order for the rerouting. The new schedules had to be approved by the City Council, and this formal action was taken before the station was opened.

The subject of handling mail in and out of the new station was not decided upon until Oct. 29, when the Metropolitan Street Railway and the Terminal Company finally got together on the details of an agreement for tracks for mail cars on the station grounds.

The Metropolitan Street Railway will probably use a temporary structure on or near the present Central Avenue bridge and viaduct, while the new viaduct is being con-

structed. This structure is part of the elevated railway system and provides a shorter route than the surface line between Kansas City, Kan., and Kansas City, Mo. Efforts had been made to induce the company to use the long inter-city viaduct, over which street cars have not been run for several years. It is reported that an interurban line may possibly use the inter-city viaduct.

An interesting feature of the rerouting in Kansas City is that the Independence line of the Metropolitan Street Railway will run on Twelfth Street to and through the business district. This is the first time that Twelfth Street, one of the main east and west arteries, has ever carried any other than the Twelfth Street car line, and it is the only downtown street that, except for a block or so, has been devoted to a single line. This routing puts the Independence cars through the south edge of the office and shopping district, while most of the non-Metropolitan interurbans pass through the office and shopping district north and south.

PUBLIC RELATIONS IN OKLAHOMA

The following editorial complimentary of the Oklahoma Railway, Oklahoma City, Okla., was published recently in the *Daily Oklahoman:*

"Hundreds of visitors during the State Fair period have had occasion to appreciate the kindly courtesy of street car men. Motormen have been careful to watch for belated, hastening passengers and have not followed the Eastern custom of 'failing to see' some breathless runner only a short distance out of line.

"Implicit confidence has been reposed by scores and scores of passengers in the street car conductors of Oklahoma City's lines, and they have not been betrayed. They have relied upon the car men to notify them when they reached certain streets, to direct them how to get to various points, to inform them of this and that, which, in reality, is no part of the conductor's duty except in the first-named instance.

"Little neglect or forgetfulness has been apparent on the part of conductors during this rather strenuous period, and Oklahoma City owes quite a debt of gratitude to the street car men for assisting in impressing upon strangers this city's reputation for hospitality. Politeness and acts of accommodation pay. And because some have been thoughtless of the courtesy extended them by the street car men we take this occasion publicly to express appreciation of it."

Following the publication of the editorial the company through George W. Knox, vice-president and general manager, caused the following notice to be posted:

"ATTENTION BOYS!

"Does It Pay to Be Courteous?

"Here is an unsolicited editorial which was in this morning's *Oklahoman*, and is a direct result of our talks on courtesy in our trainmen's meetings and your response and efforts toward promoting courtesy and good-will to the patrons of this road.

"You should appreciate this editorial and I want you to know that this company appreciates it and your efforts in bringing about conditions which prompted the writing of this article, as it means so much to you and to the Oklahoma Railway, namely, to have the kind consideration and friendly feeling of the people with whom you are dealing.

"Keep up the good work and still greater reward will be yours."

CLEVELAND RAPID TRANSIT RAILWAY FILES $50,000,000 MORTGAGE FOR RECORD

A mortgage for $50,000,000 in favor of the Central Trust Company, New York, was filed at Cleveland, Ohio, on Oct. 23 by the Cleveland Rapid Transit Railway. This is the first step toward financing the proposed underground railway in the city. W. R. Hopkins, president of the company, said that the present ordinance calls for the construction of a line east from the Public Square and another west, as soon as the high-level bridge across the Cuyahoga River will permit operations. The first funds derived from the sale of the bonds secured by the mortgage will be devoted to the construction of these two lines. Stock of the company will also be sold and the proceeds devoted to the same purpose.

It will be necessary to have the franchise ordinance amended in order to carry out the plans. It is now proposed to make the tube 12.6 ft. high and 21.8 ft. wide instead of 8 ft. high and 13.2 ft. wide, as originally designed. It will accommodate surface and interurban cars, under the modified form, while as originally designed only the Du Pont type of underground car could be operated. Two of the interurban lines leave the city on the east side and two on the west. While definite statements have not been made in regard to them, the subway would undoubtedly offer them an excellent means of increasing their running time between Cleveland and other points.

W. F. Thompson, president of the City Council, favors a liberal franchise to the company, but believes that an entirely new grant should be made if the city is to be asked for changes in the original grant. He also believes that the company should furnish the city with a certified check for a substantial amount as a guaranty that the company will begin the work within a specified period and will comply with the terms of the ordinance in other respects. The first grant to the company was made under the administration of the late Tom L. Johnson in 1908. Later the ordinance was modified to give the company an extension of time within which to commence work. Other changes will now be requested.

DECISION OF PITTSBURGH ARBITRATORS

The decision of the arbitrators in the wage dispute between the Pittsburgh (Pa.) Railways and the motormen and conductors employed by the company was handed down late on Nov. 2. An adverse decision to the employees was made by the arbitrators, Congressman Stephen G. Porter, representing the men, dissenting from the joint opinion of Judge Joseph Buffington of the United States Circuit Court of Appeals, who was the third arbitrator, and Attorney James C. Gray, representing the company.

The employees wanted a flat wage rate of 35 cents an hour instead of wages based on the length of service. The present rate is 23½ cents an hour for the first six months, 26 cents for the second six months, 26½ cents for the second year, 28 cents for the third year, 29 cents for the fourth year and 30 cents an hour for the fifth year and thereafter. All the points of contention of the employees were refused. In the matter of Sunday pay, both the company and the employees were refused, the company having asked for a decrease and the employees for an increase in wages. The present Sunday wage rate will be continued.

The wage question has been up for settlement in Pittsburgh since last spring.

NEW HAVEN DIRECTORS INDICTED

Twenty-one directors, past and present, of the New York, New Haven & Hartford Railroad were indicted on Nov. 2 by the Federal Grand Jury for conspiracy to monopolize interstate commerce by acquiring the control of practically all the transportation facilities of New England. This is the result of the government investigation of New Haven affairs which has been in progress for more than a year and which, as regards the civil aspect of the case, was settled by a decree to which both sides agreed before it was presented for Judge Mayer's signature two weeks ago. Charles S. Mellen, formerly president of the company, who was the chief witness before the Grand Jury and thus gained immunity, was not indicted. The defendants named in the true bill were William Rockefeller, George Macculloch Miller, Charles F. Brooker, William Skinner, D. Newton Barney, Robert W. Taft, James E. Elton, James S. Hemingway, Lewis Cass Ledyard, Charles M. Pratt, A. Heaton Robertson, Frederick F. Brewster, Henry K. McHarg, Edward D. Robbins, Alexander Cochrane, John L. Billard, George F. Baker, Thomas De Witt Cuyler, Theodore N. Vail, Edward Milligan and Francis T. Maxwell. Nearly fifty men, some of whom are now dead, were mentioned in the indictment as having conspired with the twenty-one, although they were not indicted. The indictment was handed up in the morning to Judge Foster, who was sitting temporarily in the Federal District Court in New York, Assistant Attorney General Frank M. Swacker,

R. L. Betts, and James W. Osborne were present for the government, and Mr. Osborne asked that bench warrants might issue immediately for the defendants. This was ordered by the court, and the federal officials immediately began to notify the defendants who were in the city. On Nov. 6 only three of the indicted men had not yet appeared before the court to enter pleas. They were Messrs. Cuyler, Elton and Brooker. Interest centered in the appearance of William Rockefeller on Nov. 5.

State Utilities Board Appointed in Maine.—Governor Haines of Maine on Oct. 30 appointed Benjamin F. Cleaves, Biddeford, William B. Skelton, Lewiston, and Samuel W. Gould, Skowhegan, as member of the Board of Public Utility Commissioners created by a new law. All three of the men are lawyers.

Barcelona Development Plans.—It is reported that the construction work of the Barcelona Traction, Light & Power Company remains at a standstill because of the inability of the French bankers to continue payment upon securities underwritten shortly before the war broke out. It is said there is a market in Spain for all the power the company can produce, even under present conditions. The main construction of the company, however, is hung up because of the lack of funds.

Another Pittsburgh Subway Franchise.—Another subway ordinance has been presented to the City Council of Pittsburgh, Pa. The new measure provides that the downtown terminus of the proposed subway be at least as far west as Ferry Street and the eastern terminus as far east as Kelly Street. The route would be through the Oakland district, or, if not, there would be a spur run into Schenley Park and near-by territory. The ordinance has been referred to the committee on surveys.

Communication of Toledo League to the Council.—The City Council of Toledo, Ohio, received a communication from the Municipal Ownership League recently urging that all negotiations with the Toledo Railways & Light Company be abandoned and that legislation be enacted looking toward the acquirement of the company's property by the city. The league contends that the remaining franchises held by the company expired on Nov. 7, 1914. The letter has been referred to the committee on railroads and telegraphs of the Council for consideration.

Loyal Railway Purchase Negotiations.—A committee comprising Councilmen Cooley, Haas, Hesketh, Marble and Lundy and Superintendent of Public Utilities Valentine of Seattle, Wash., has been appointed by the city utilities committee of the City Council to confer with Harry Whitney Treat in regard to purchasing the Loyal Heights Electric Railway, owned by Mr. Treat. The property has been offered to the city for $80,957, which Mr. Treat asserts he has invested in the property. Mr. Valentine has estimated that the line could be duplicated for $53,366. If the City Council should decide to purchase the line it will be made an adjunct to the Seattle Municipal Railway.

Mexican Operators Embarrassed.—The syndicate, headed by Dr. F. S. Pearson, New York and London, which owns the electric tramways in the city of Mexico and the hydro-electric plant at Necaxa, and the lighting and power system of the capital and other cities, has been greatly embarrassed in the conduct of its business by the attitude displayed toward its interests by the Constitutionalist government. A few weeks ago when the demand of the Mexican employees of the tramways for a 100 per cent increase in wages was not granted, General Carranza ordered the federal district authorities to take over and operate the property pending a settlement of the trouble between the men and the management. No settlement has yet been reached and the government is still operating the lines.

Public Relations in Las Vegas.—W. P. Southard, manager of the Las Vegas (N. M.) Transit Company, has been unanimously re-elected president of the Commercial Club of that city. In commenting upon the election, the Las Vegas *Optic* states that "during the twelve months in which he has been at the head of the Commercial Club, Mr. Southard has accomplished more for the club than has anyone ever before during the period of the club's existence." In placing Mr. Southard in nomination, speakers of the evening gave him unstinted praise for his great work in promoting the interests of the organization. It is the policy of the Federal Light & Traction Company, which controls the property at Las Vegas, to urge its representatives to take an interest in the affairs of the cities in which the company operates.

Intra-Mural Railway at Exposition Under Construction.—A shipment of rails and ties for the miniature railway at the Panama-Pacific Exposition, San Francisco, Cal., has arrived on the grounds and about fifty men are at work grading and laying track. Although the locomotives and other equipment, except in the interior of the cars, as described in the ELECTRIC RAILWAY JOURNAL of June 13, 1914, are just one-third standard size, the system is expected to handle a great volume of traffic across the grounds. The gage is 19½ in., and cars 20 ft. long have been built with seats for twenty passengers. With ten cars per train and eight trains in operation, the maximum operating capacity of the system will be 1600 passengers. Conforming to speed regulations, the trains will make about 10 m.p.h. between stations, of which there are to be seven, including three terminals, for which elevated tracks, train sheds and turntables are being built.

City Checks Chicago Elevated Railroad Valuation.—A new appraisal of the Chicago elevated railroad properties, ordered by the local transportation committee of the Chicago City Council as a preliminary to reopening negotiations for a merger of the surface and elevated lines, is being conducted by the department of public service. In connection with this valuation Montague Ferry, commissioner of public service, has undertaken to determine the value in dollars and cents of the franchise of the elevated railroads. In all its dealings with the traction companies, the local transportation committee has never recognized franchise or other intangible values. In a statement regarding what the franchise value might be, Commissioner Ferry said that he had as yet not reached a definite conclusion. It is understood that as soon as these valuation figures have been completed negotiations will again be resumed for the merger of the elevated and surface lines with a one-city, one-fare offer as the basis.

St. Louis Bridge Franchise.—Mayor Kiel of St. Louis says that he will sign the repeal of the Lorimer-Howe franchise which the City Council has already passed and which the House of Delegates is now about to approve. "Jep" Howe, a former "boss" in St. Louis has admitted to W. C. Niblack, receiver for the LaSalle Street Trust & Savings Bank, Chicago, William Lorimer's defunct banking institution, that he received $300,000 of the bonds of the Southern Traction Company as attorney's fees for assisting the passage of a franchise through the House of Delegates and the City Council of St. Louis and that the bonds were pledged when the LaSalle Street Trust & Savings Bank went into the hands of a receiver. Mr. Howe now demands the return of the bonds by the receiver. Three times the people of St. Louis have refused to vote a bond issue to build an eastern approach to the municipal bridge, on the grounds that no one company had an exclusive right to the use of the bridge.

Investment Bankers of America.—The third annual convention of the Investment Bankers' Association of America will be held at the Bellevue-Stratford Hotel, Philadelphia, on Nov. 12 and 13. President George B. Caldwell will call the convention to order at 10 o'clock Thursday morning. A considerable part of that day will be devoted to reports of officers and committees. In the afternoon Howard S. Graham, president of Graham & Company, Philadelphia, will discuss the 5 per cent railroad rate case and Sir George Paish will talk on the English moratorium. Friday will be devoted to a number of important addresses by prominent financiers, the election of officers closing with a banquet. The addresses include: "An Equitable Solution of Our Public Utility Problems," by Andrew J. Frame, president of the Waukesha National Bank, Waukesha, Wis. "Railroad Maintenance and Depreciation," by William H. Coverdale, president of William H. Coverdale & Company, Inc., New York, and "The Federal Reserve Bank and Its Effect on Investment Securities," by H. Parker Wills, secretary of the Federal Reserve Board, Washington, D. C.

Bay State Street Railway Wages to be Arbitrated.—Negotiations between the employees of the Bay State Street Railway, Boston, Mass., and the company have resulted in an agreement to arbitrate wages. The usual method of selection will be followed, the company and the men naming one arbitrator each, the third being chosen by the two thus named. The company offered the platform men an increase of half a cent an hour for the first year under the desired new agreement and an additional half cent an hour for the second year, the graduated scale, which requires a man to work seven years to obtain the maximum rate, remaining the same. A further guarantee was offered to extra men of at least a five-hour work day. The present scale of wages is 24 cents an hour for the first year, 25 cents for the second, 26 cents for the third to fifth years inclusive, 27 cents for the sixth and seventh years, and 28 cents thereafter. The present agreement expired on Oct. 1. In the negotiations preceding the making of the arbitration agreement, the company refused to reduce the hours of the shopmen and the employees in other departments from ten to nine a day. The company also refused to grant shopmen an increase in wages at this time.

Public Relations in Meridian.—The Meridian *Star* recently contained an illustrated description of the activities of the Meridian Light & Railway Company, Meridian, Miss. The sub-title to the article was "A public service corporation that has won the good-will and consideration of the community in which it is operated through its liberal, fair and equitable treatment of the public and efficiency of its service in every department. An important factor in the growth and progress of Meridian, the metropolis of Mississippi." The article concluded with the following tribute to the management of the company: "A distinguishing characteristic of this operation is the recognition which it constantly manifests, of its identity with the city in which its operations are conducted and the unity of interests that subsists between it and the people whom it serves. No movement of any kind is inaugurated in the name of progress for material, moral or social advancement that it does not give hearty and generous support, while its service is constantly laid under contribution in behalf of some worthy cause or occasion that needs it. It is, essentially, and logically, a city builder, it realizes that its profits and prosperity depend upon the growth of the city and a constant increasing demand for the utilities which it supplies. Moreover, it understands that its best asset lies in the good-will and the approval of this public, and that to secure these an efficient and adequate service in every department of its activities must be maintained, while justice, consideration and right treatment must govern its relations with every patron."

PROGRAM OF ASSOCIATION MEETING

Central Electric Railway Association

The program has been announced for the meeting of the Central Electric Railway Association, which is to be held in Fort Wayne on Nov. 19 and 20. This meeting will be preceded by a meeting of the executive committee on the evening of Nov. 18. The meeting of the Central Electric Traffic Association will be held on Nov. 19. The program for the meeting of the Central Electric Railway Association is as follows:

Nov. 19

Report of standardization committee, by R. N. Hemming, chairman, superintendent of motive power of the Union Traction Company of Indiana, Anderson, Ind.

Paper, "Treatment of Ties or Wood Preservation," by W. F. Goltra, president of the W. F. Goltra Tie Company, Cleveland, Ohio.

Paper, "Inter-Mating Tool-Steel Pinions with Untreated Gears," by E. S. Sawtelle, assistant general manager of the Tool Steel Gear & Pinion Company, Cincinnati, Ohio.

Nov. 20

Paper, "Interurban Headlights," by J. W. Esterline, president and general manager of the Esterline Company, Indianapolis, Ind.

Paper, "Oxy-Acetylene Welding," by H. E. Smith, engineer of the Prest-O-Lite Company, Indianapolis, Ind.

Paper, "Selection of Railway Equipment," by J. F. Layng, engineer of the General Electric Company, Schenectady.

Financial and Corporate

CONDITION OF THE COUNTRY

Many auspicious events have marked the operations of the financial and money markets during the last week. The deficiencies in cash reserves registered each week since the outbreak of hostilities have been wiped out, and sterling exchange rates have actually been brought down below the gold export point. Moreover, with the end of the British moratorium outstanding credits in our favor have been released and the exchange market is again in equilibrium. These are not the only causes of optimism, however, on the part of commercial representatives. The promised opening of the federal reserve banks on Nov. 16 will place at the command of industry and trade hundreds of millions of dollars. Foreign orders for American products continue to pour in, and large credits have been established with New York bankers by foreign interests to support their purchases. Exports, while much behind last year, are showing monthly increases, and a balance of trade in our favor is being accumulated which should relieve the effect upon foreign-held American securities when the stock markets open.

An interesting analysis of this whole situation, although at first glance pessimistic, has just been made by Wm. Morris Imbrie & Company, New York. According to this banking house, a decline in business in September as compared to the corresponding period for last year, was shown in the following cases: New buildings, total bank clearings, bank clearings excluding New York, failures, imports and exports of merchandise, balance of trade, railroad earnings, New York deposits, new securities issued, gold production and idle cars. Offsetting this poor showing, however, are the facts that in commodity prices and New York bank loans there was an active business as compared to last year, that crops and production have increased and that railroad earnings, money in circulation, New York bank loans and deposits, exports and the balance of trade exhibit more favorable results for September than for August of this year. These increases for September may be taken as indicative of the more extended improvement that took place during October and will develop even more so now. The condition of business is still not satisfactory, but there is at least ground for increased cheerfulness.

STABILITY OF UTILITY EARNINGS

S. R. Bertron Finds Gratifying Stability of Such Earnings Under Conditions Caused by the European War

S. R. Bertron, of Bertron, Griscom & Company, New York, in speaking of present conditions to a representative of the Electric Railway Journal, said that the stability in earnings of public utility corporations is a gratifying, although not an unexpected, element in the situation.

"We believe that public service company securities are the best that we can offer to our customers where the companies themselves have good franchises and are well managed," said Mr. Bertron. "They supply public necessities at a minimum cost under special franchise requirements, and every dollar of revenue is received in cash. There is less shrinkage in income in properties of this character in bad times than in any others that we know. Even under the present depressed conditions the earnings of most electrical central stations and gas companies are ahead of last year, while street railways show only a very small shrinkage from last year, varying from 1 per cent to 4 per cent. Up to the present the lighting companies in which we are interested show an average increase in gross earnings over last year of about 6 per cent and the street railways about three quarters of 1 per cent. The net result is that, instead of showing a normal increase in business, public service companies as a whole show some increase, even though a small one."

Mr. Bertron, when asked about the effect of the conditions arising from the European war upon capital expenditures of public service properties, said:

"The companies which we represent spend normally about $7,000,000 annually in new capital. On account of the difficulty of raising new capital now, expenditures of this character are being made only in necessary cases. Just when

this policy will change depends upon financial conditions here. It is not necessary to assume, and we do not conclude, that we shall need to wait until the end of the war before undertaking new financing. It is probable that before the war is over financial conditions will permit the resumption of something like normal extensions.

"As business becomes adjusted to conditions and as the new currency act produces the promised release of a large volume of funds, and as economies of the people generally begin to tell in increased bank balances, the result should produce more comfortable rates for money. There are indications now that we are gradually approaching that stage of the situation. The improvement of conditions in the South resulting from the extension of credits now promised by bankers to the cotton growers will be a material factor and a favorable factor throughout the country at large."

Mr. Bertron was asked how he regarded present conditions as compared with those experienced in 1907.

"I am not sure," he said, "but that public service companies are in better shape now for the reason that conditions which preceded the panic of 1907 were very different from the conditions which preceded the outbreak of the war this year. Prior to 1907 general business of this character had been exceedingly active and was so up to the time of the panic, and the companies were expanding in full expectation of a continuance of prosperity and favorable markets for securities. At this time, however, on account of the lessened activity in general business and the depression throughout the country, public service properties were not making normal extensions and improvements at a normal rate. Consequently their construction operations did not have to be curtailed suddenly to as great an extent as was the case seven years ago."

INTERVIEW WITH MR. SCOTT

Holton H. Scott, president National Electric Light Association and general manager Doherty Operating Company, New York, gave some interesting views on the business situation in an interview this week with a representative of the ELECTRIC RAILWAY JOURNAL. The operations of Mr. Scott's company extend over sections in all parts of the United States except the Pacific Coast, and it tries to keep closely in touch with general business conditions in the communities served. Mr. Scott said that the Southern States dependent upon the cotton industry directly feel present conditions more than do other parts of the United States, with the possible exception of the districts dependent upon the oil market, but conditions for both are reflecting the improvement resulting from the marketing of part of their products.

Mr. Scott had just returned from a trip to Oklahoma, Kansas and other Middle Western states. Except in certain parts of Oklahoma directly affected by the oil market, he found things normal. In fact, Kansas and the other largely agricultural states seemed to be very prosperous and the people were decidedly optimistic. In Ohio, where his company operates several public utilities, large steel works were under construction in Warren and Massillon when the European war broke out. In spite of this, however, work on these new factories has been continued without a break. Many of the manufacturing towns in Ohio are operating, at least up to this date, at their normal capacity. Mr. Scott spoke as if the greatest amount of pessimism seen by him was found in New York.

He said, referring particularly to lighting companies, that public utilities have been affected by present conditions. Yet there are so many fields for enlarging the use of gas and electrical energy that, even if the increment of increases is reduced, the general average gross and net earnings should continue to increase. Many central station companies are curtailing construction expenditures and endeavoring instead to increase their business without extending their lines and enlarging their power stations, which will eventually be reflected in renewed prosperity and increased sales of appliances by manufacturers and jobbers.

In conclusion, Mr. Scott said that he had had occasion during the last few months to come into contact with many heads of electric lighting companies, and these men, instead of being pessimistic, are confident that the present disturbed conditions are being rapidly readjusted.

ANNUAL REPORT

Boston & Worcester Electric Companies

The comparative statement of income, profit and loss of the Boston & Worcester Electric Companies, Boston, Mass., for the years ended June 30, 1913 and 1914, follows:

	1914	1913
Income:		
Dividends on Boston & Worcester Street Railway shares owned	$55,688	$50,625
Other income	15,349	19,057
Total income	$71,037	$69,682
Disbursements:		
Dividend of $1 per share on preferred shares, payable Jan. 1, 1914	$33,936	$33,936
Dividend of $1 per share on preferred shares, payable July 1, 1914	33,936	33,936
Miscellaneous expenses	1,063	1,388
United States income tax	651	.....
Total disbursements	$69,586	$69,260
Surplus for year	$1,451	$422
Surplus brought forward	14,917	14,495
Surplus	$16,368	$14,917

The comparative statement of income, profit and loss of the Boston & Worcester Street Railway for the years ended June 30, 1913 and 1914, follows:

	1914	1913
Revenue from transportation:		
Passenger revenue	$638,212	$631,169
Mail revenue	452	451
Freight and express revenue	71,171	24,938
Miscellaneous transportation revenue	649	200
Total revenue from transportation	$710,484	$656,758
Miscellaneous revenue	6,452	12,180
Total revenue	$716,936	$668,938
Expenses of operation:		
For conducting transportation	$258,279	$209,853
For maintenance	128,459	133,802
For general expense	78,339	74,192
Total expenses of operation	$465,077	$417,847
Net revenue above operation	$251,859	$251,090
Interest on funded and floating debt	$120,693	$124,241
Taxes	46,669	47,971
Total	$167,362	$172,212
Net surplus for year	$84,497	$78,878
Dividends on preferred stock paid during year	$23,832	$23,687
Dividends on common stock paid during year	55,688	50,625
Total	$79,520	$74,312
Surplus for year after dividends	$4,977	$4,566

The gross earnings increased from $656,758 in 1913 to $710,484 in 1914, the largest increases being from $631,169 to $638,212 for passenger revenue and from $24,937 to $71,171 for freight and express revenue. The expenses for conducting transportation increased from $209,853 to $258,279 and general expenses from $74,192 to $78,339, while maintenance expenses decreased from $133,802 to $128,459. The chief maintenance items for 1914 were repairs to track and roadway and line, $63,110, and repairs to rolling stock and miscellaneous equipment, $54,514. The net revenue of the company remained practically constant, but taxes and interest decreased from $172,212 to $167,362, giving an increase in net surplus from $78,878 to $84,497. Dividends increased from $74,312 to $79,520, leaving a surplus for the year of $4,977, as compared to $4,566 for the year previous. The car-miles operated during the year amounted to 2,108,294 and the car-hours to 132,174.

Dick, Kerr & Company

The annual meeting of Dick, Kerr & Company, the British electrical manufacturers, was held in London on Oct. 15. The chairman said that the net profits, which two years ago were £3,000, had increased to £30,000 a year ago and for the past year were £45,000. The fiscal year ended June 30, so that the accounts for the past year showed no effect of the war. Originally the firm was a contracting one, but with the development of the electric tramway the construction of electrical apparatus had been undertaken. With the diminution of new tramway construction, however, the company had again taken up general contracting, large work done during the last year including the construction of

a steam railroad in Portuguese East Africa and a reservoir for the Metropolitan Water Board. The company had recently a contract for the electrification of the complete suburban system of the London & South-Western Railway and the Manchester lines of the Lancashire & Yorkshire Railway. It was stated that certain departments, such as the contracting department, would be detrimentally affected by the war, as the construction of public works would be deferred. Other departments should be stimulated, and the company now did not have the German competition for electrical equipment. Claud T. Cayley, chairman of the board, was re-elected to the board at the annual meeting.

ANNUAL MEETING OF BOSTON ELEVATED RAILWAY

At the annual meeting of the Boston Elevated Railway on Nov. 2, Sydney Harwood, Newton, Mass., was elected a director in place of Charles P. Hall, resigned. In his annual report, President Bancroft pointed out that the cost per running foot of building the Cambridge subway was the lowest for all subways recently built in Boston. The most serious problem before the company in the year had been the demands of labor. As a result of the findings of the board of arbitration, published in the Electric Railway Journal of Jan. 15, 1914, operating expenses were increased by not less than $480,000, or about 2 per cent upon the capital stock. The increase dated from May 1, 1913, so that there was charged to surplus $53,000 as not being applicable to this fiscal year. On May 1, 1914, a second increase required by the award became effective, and another is due May 1, 1915.

Reference was made by Mr. Bancroft to the opening of the Boylston Street subway on Oct. 3, which reduced the surface running time on the round trip from Kenmore Street to Charles Street by 14.5 minutes. The construction of the Dorchester tunnel has proceeded as far as Dewey Square, but the opening of this route, with that of the East Boston tunnel extension in the West End, cannot now be determined. During the year the company added 3.77 miles of surface track, making its total trackage 514.76 miles. A new cut-off line to City Point, South Boston, from Dewey Square, was opened last spring, giving the company three double-track lines to this resort. The company has received all of the 175 new cars mentioned in the last report. Thirty-two stepless, prepayment, middle-entrance, vestibule articulated cars have been placed in service and forty-three more have been authorized. Work has been suspended on the elevated extension to Everett from Sullivan Square pending the approval of national and state authorities.

During the year the capacity of the Coolidge Corner substation was increased from 4000 kw to 6000 kw; a 2000-kw transformer was added to the Harvard power station and arrangements were made to extend the boiler house at the main generating plant in South Boston, to provide for four new boilers and also to build and equip a new 4000-kw substation near Andrew Square. An agreement was reached with the Edison Electric Illuminating Company of Boston for the interchange of energy in case of a surplus or need on either side, through a 9000-kva frequency changer set. The net cost of workmen's compensation insurance for the year is estimated at $55,849. The work of the company's safety committees has reduced the cost of insurance, and employees' accidents decreased 21.7 per cent during the year.

A brief report of the company for the fiscal year ended June 30, as presented to the Massachusetts Public Service Commission, was published in the Electric Railway Journal of Oct. 24. The total revenue passengers carried during the year were 343,181,049, an increase of 16,828,186, or 5.16 per cent for the year. The number of revenue miles run was 57,990,436 and the revenue car hours 5,406,132. The miles of track equipped with electric third rail system were 36.24 and the miles equipped with electric overhead system 488.409. The stockholders of record June 30 are divided geographically in number as follows: Massachusetts, 5055; other states, 576; Cuba, 1; British provinces, 21; Europe, 12; South America, 1; Asia, 1, or a total of 5667. Grouped by shares the sections rank as follows: Massachusetts, 216,101; other states, 20,877; Europe, 1164; British provinces, 616; Cuba, 25; Asia, 10, and South America, 1.

DETAILS OF COLUMBUS REFUNDING ISSUE

As noted in the Electric Railway Journal of Oct. 24, the Columbus Railway, Light & Power Company has been authorized by the Ohio Public Utilities Commission to issue its first refunding and extension sinking fund 5 per cent mortgage gold bonds to refund underlying bonds. This refunding is to be accomplished from time to time as the holders may agree, as follows: (1) For the $3,000,000 of first consolidated mortgage forty-year 5 per cent gold bonds of the Columbus Street Railway, dated July 1, 1892, an even exchange at face value. (2) For the $572,000 of first mortgage forty-year 5 per cent gold bonds of the Crosstown Street Railway, dated June 1, 1893, an even exchange at face value. (3) For the $409,000 of the first mortgage twenty-year 5 per cent sinking fund gold bonds of the Central Market Street Railway, dated Jan. 1, 1902, an even exchange at face value. (4) For the $300,000 of first mortgage 5 per cent gold bonds of the Columbus Edison Electric Light Company, dated April 1, 1899, an even exchange at face value. (5) For the $3,145,000 of first consolidated mortgage forty-year 4 per cent gold bonds of the Columbus Railway, dated Oct. 2, 1899, or as much as the Columbus Railway, Power & Light Company is unable with the consent of the holders to retire by issuing its 4 per cent prior preference stock, an exchange on the basis of $850 face value of the petitoner's first refunding 5 per cent gold bonds for each $1,000 face value of these Columbus Railway bonds. (6) For the $450,000 of first mortgage 6 per cent gold bonds of the Columbus Electric Company, dated Nov. 1, 1897, or as much as the petitioner is unable with the consent of the holders to retire by issuing its 6 per cent preferred stock, series A, an exchange on the basis of $1,100 face value of the petitioner's first refunding 5 per cent gold bonds for each $1,000 face value of Columbus Electric Company bonds.

The company was further authorized to issue: (1) An amount of $3,145,000 of its 4 per cent prior preference stock at par, to refund the first consolidated mortgage 4 per cent bonds of the Columbus Railway at face value from time to time as the holders of these bonds may agree, with the option to these stockholders to exchange the stock back at any time before Oct. 1, 1924, for the petitioner's first refunding 5 per cent gold bonds at $850 face value of the bonds for $1,000 face value of the stock; (2) an amount of $450,000 of the company's preferred stock, series A, at par, to refund the first mortgage 6 per cent bonds of the Columbus Electric Company at face value, as may be agreed.

It is provided by the commission, however, that the above stated authority to issue 4 per cent prior preference stock as well as to issue the bonds in refunding the outstanding 4 per cent bonds of the Columbus Railway is an alternative authority. In so far as any of the bonds of the Columbus Railway are refunded into the first refunding 5 per cent gold bonds of the petitioner, the authority granted to refund the bonds of the Columbus Railway into an equal amount of prior preference stock is to be of no further force. As regards the refunding of Columbus Railway bonds into prior preference stock, the same holds true, except that the Columbus Railway, Light & Power Company may in turn issue its first refunding 5 per cent gold bonds in exchange for the prior preference stock theretofore issued in refunding the Columbus Railway bonds as authorized, if the stockholders exercise their option on or before Oct. 1, 1924. The authority granted to issue the 6 per cent preferred stock, series A, or bonds in refunding the $450,000 of 6 per cent bonds of the Columbus Electric Company, is also a similar alternative authority.

City Light & Traction Company, Sedalia, Mo.—The City Light & Traction Company, which is controlled by the Cities Service Company, recently offered in Sedalia at par and interest $25,000 of secured one-year 6 per cent coupon gold bonds, par $100, dated Oct. 1, 1914. The notes are issued for improvements and are backed by $50,000 of the company's first mortgage bonds as security.

East St. Louis & Suburban Company, East St. Louis, Ill.—The East St. Louis & Suburban Company, registered at Camden, N. J., on Oct. 31 decreased its capital stock from

$14,000,000 to $1,000,000. The stock will now be divided into 600 shares of preferred stock and 9400 shares of common stock at $100 par.

Fresno (Cal.) Interurban Railway.—The Railroad Commission of California has issued a supplemental order authorizing the Fresno Interurban Railway to issue $86,000 of ten-year 6 per cent bonds at not less than 90, and 460 shares of capital stock, par value $100, at not less than 80. The proceeds derived from the sale of these securities are to be used for the construction of an electric railway between Fresno and Clovis, a distance of approximately 9 miles. The parties promoting this line have already signed bonus agreements amounting to more than $17,000. These bonuses and any others acquired will be placed in a special fund to be used in making up any deficits that may occur during the early years of operation. If after three years the company's earnings are sufficient to pay its bond interest, operating expenses and taxes, any surplus remaining in the fund will be held as a sinking fund for the redemption of the bonds. The previous order of the commission was noted in the issue of the ELECTRIC RAILWAY JOURNAL of Oct. 31.

International Traction Company, Buffalo, N. Y.—Henry Morgan has been elected a director of the International Traction Company to succeed T. DeWitt Cuyler.

Los Angeles & San Diego Beach Railway, San Diego, Cal.—The Railroad Commission of California has authorized the Los Angeles & San Diego Beach Railway to issue a sufficient amount of bonds to yield $250,000 in cash, the proceeds to be used for the electrification of the company's line, the improvement of its properties, and the payment of certain obligations due to E. S. Babcock. The company has also filed an application with the commission requesting authority to issue two promissory notes amounting to $11,000 at 7 per cent interest for the purpose of refunding other notes outstanding.

New York (N. Y.) Railways.—The Public Service Commission for the First District of New York has granted the application of the New York Railways for authority to purchase all the outstanding capital stock of the Twenty-third Street Railway (6000 shares of $100 each), but on the condition that the company, in issuing its thirty-year 4 per cent gold bonds not to exceed $2,100,000 in payment, provide for the amortization of the difference between the par value and the market value of such bonds. The company proposes to purchase 4305 shares immediately, and the remainder are to be acquired from time to time as arrangements may be made. The commission authorizes the purchase upon the following conditions: (1) That the bonds be delivered only to holders of the stock at the rate of $350 face value of bonds for one share of stock; (2) that no such bonds be issued except in exchange for such stock; (3) that the railway provide for the amortization of 22 per cent of the face value of all bonds so issued, this representing the discount on the bonds; (4) that it keep open until Dec. 31 its offer of $350 face value of bonds for one share of stock, and notify all stockholders of the Twenty-third Street Railway of the acquisition of the majority of the stock and of its willingness to acquire the remainder upon the same terms on or before a specified date, not earlier than Dec. 31, 1914, and (5) that the time in which the bonds are to be issued shall expire Jan. 31, 1915.

Ohio Service Company, Dennison, Ohio.—The Public Utilities Commission of Ohio on Oct. 14 issued a final order authorizing the Ohio Service Company to issue $929,808 of three-year convertible notes, bearing interest at 6 per cent payable semi-annually and convertible into mortgage bonds within three years after their date. These notes are to be transferred in full and final payment for the properties purchased under the authority of the commission, as follows: $70,000 in payment for the purchase of the street railway property of the Twin City Traction Company at Dennison and Uhrichsville; $400,000 for the purchase of the electric lighting, ice manufacturing and street railway properties of the New Midland Power & Traction Company, Cambridge, Ohio, and the line running from Cambridge to Pleasant City; $424,000 for the purchase of the electric lighting plant at Canal Dover, the electric lighting and steam-heating plant at New Philadelphia, and the electric lighting plants at Dennison and Uhrichsville of the County Electric Company; and $35,808 for the purchase of the transmission line now being erected by the Lafayette Light & Power Company in Coshocton, Cambridge, Dennison, Uhrichsville, New Philadelphia and Canal Dover. This order supplements those noted in the ELECTRIC RAILWAY JOURNAL of Jan. 3, June 27 and Oct. 10.

Pacific Gas & Electric Company, San Francisco, Cal.—The Pacific Gas & Electric Company recently announced that it would purchase and accept delivery, as of Oct. 31, at the lowest prices offered, of $2,500,000 of its one year 5 per cent gold notes maturing March 25, 1915. These notes are part of an outstanding issue of $7,000,000. Owners of these notes were invited to forward sealed tenders to the Bankers' Trust Company, New York, on or before Oct 27, the tenders to be exclusive of accrued interest. A committee consisting of representatives of the Bankers' Trust Company, Harris, Forbes & Company and N. W. Halsey & Company was to supervise the transaction and had the right to accept or reject any or all bids in whole or in part. The Railroad Commission of California on Oct. 23 authorized the Pacific Gas & Electric Company to renew a promissory note of $100,000 to the National Conduit & Cable Company, bearing 6 per cent interest and payable not later than Oct. 20, 1915.

Portland, Eugene & Eastern Railway, Portland, Ore.—The annual report of the Portland, Eugene & Eastern Railway for the fiscal year ended June 30, which was recently submitted to the Oregon State Railroad Commission, shows a profit on the electric lines and a large deficit on the steam line of the company. According to this report, the company owns 105.68 miles of line and operates under lease or contract 3.05 miles, a total of 108.73 miles. Capital stock outstanding amounts to $508,800; funded debt outstanding, $1,200,000; capitalization per mile of line, $16,061; investment for road and equipment, $4,253,070; per mile of line, $30,974; operating revenues, electric, $190,219; operating expenses, electric, $171,752; operating revenues, steam, $88,405; operating expenses, steam, $121,801; operating deficit, $14,929; passengers carried, 3,687,700.

Richmond & Henrico Railway, Richmond, Va.—The Virginia Trust Company, Richmond, Va., which was appointed receiver for the Richmond & Henrico Railway on June 3, 1913, sold this company's property on Nov. 5 to E. Randolph Williams, counsel for the Virginia Railway & Power Company, for a consideration of $700,000. The company has an authorized capital stock of $1,250,000 and $2,500,000 of first mortgage 5 per cent bonds. It was organized about four years ago as a competing company to the Virginia Railway & Power Company. The receiver was appointed following a default in interest.

San Joaquin Light & Power Corporation, Bakersville, Cal.—The Railroad Commission of California has authorized the San Joaquin Light & Power Corporation to renew certain promissory notes, aggregating $64,156, for such periods of time as the applicant may desire, provided the aggregate of such renewal does not exceed one year from the date of the order. The new notes are to be issued at full face value and at the rate of interest which is specified in the company's application.

Seattle (Wash.) Municipal Railway.—The total receipts of Division "A" and Division "C" of the Seattle Municipal Railway for September showed a decrease of $732 as compared to the revenues for the preceding month, according to Superintendent of Public Utilities Valentine. The Lake Burien line showed the greatest drop in revenues, the freight and passenger revenues for September being $1,277 as compared to $1,888 in August, a decrease of $611. It is expected that the decrease in receipts in the autumn, on account of lighter passenger travel with the retirement of campers and summer tenants, will bring greater loss. Members of the Council are considering the adjustment of the Lake Burien schedule so that one car will be taken off part of the day. It is estimated that the municipal railway property was operated at a loss of approximately $2,000 during the summer months.

United Railways of St. Louis, St. Louis, Mo.—The Missouri Public Service Commission has authorized the United Railway of St. Louis to issue $600,000 of 5 per cent bonds, the proceeds of which are to be used in taking up an outstanding issue of 6 per cent bonds of the St. Louis & Suburban Railway.

Washington-Virginia Railway, Washington, D. C.—A dividend of 1 per cent has been declared on the $1,378,300 of common stock of the Washington-Virginia Railway along with the usual semi-annual payment of 2½ per cent on the $1,000,000 of preferred stock. These dividends were both payable on Nov. 1 to holders of record on Oct. 19. On May 1, 1½ per cent was paid on the common stock.

DIVIDENDS DECLARED

Boston (Mass.) Elevated Railway, quarterly, 1½ per cent.

Connecticut Railway & Lighting Company, New Haven, Conn., quarterly, 1 per cent, preferred; quarterly, 1 per cent, common.

Detroit (Mich.) United Railway, quarterly, 1½ per cent.

Illinois Traction System, Peoria, Ill., quarterly, three-fourths of 1 per cent, common.

Lehigh Valley Transit Company, Allentown, Pa., 1 per cent, preferred.

Rio de Janeiro Tramway, Light & Power Company, Ltd., Rio de Janeiro, Brazil, quarterly, 1¼ per cent.

Sao Paulo Tramway, Light & Power Company, Ltd., Sao Paulo, Brazil, quarterly, 2½ per cent.

Tampa (Fla.) Electric Company, quarterly, 2½ per cent.

Washington-Virginia Railway, Washington, D. C., semi-annual, 2½ per cent, preferred; 1 per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

AMERICAN RAILWAYS, PHILADELPHIA, PA.

Period		Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Sept.,	'14	$460,132	.....	.....	.....	.....
1 " "	'13	459,833	.....	.....	.....	.....
3 " "	'14	1,486,068	.....	.....	.....	.....
3 " "	'13	1,489,694	.....	.....	.....	.....

AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.

1m., Aug.,	'14	$205,384	$118,854	$86,530	$35,475	$51,055
1 " "	'13	210,926	113,899	97,028	34,095	62,933
12 " "	'14	416,146	338,743	177,403	70,986	106,417
12 " "	'13	419,677	229,689	189,987	67,558	122,429

COLUMBUS (GA.) ELECTRIC COMPANY

1m., Aug.,	'14	$54,600	*$23,985	$30,615	$28,792	$1,823
1 " "	'13	50,403	*23,706	26,698	24,489	2,209
12 " "	'14	655,653	*277,119	378,534	309,114	69,420
12 " "	'13	639,591	*293,482	284,787	249,380	96,727

LEHIGH VALLEY TRANSIT COMPANY, ALLENTOWN, PA.

1m., Sept.,	'14	$173,649	$83,170	$90,479	$57,916	$32,563
1 " "	'13	164,620	80,768	83,853	47,224	36,628
12 " "	'14	1,863,249	898,861	964,389	689,732	274,657
12 " "	'13	1,739,737	863,235	876,503	547,639	328,864

PENSACOLA (FLA.) ELECTRIC COMPANY

1m., Aug.,	'14	$22,669	$14,772	$7,897	$7,189	$708
1 " "	'13	24,953	15,470	9,483	7,055	2,428
12 " "	'14	283,238	177,469	105,770	86,237	19,533
12 " "	'13	285,036	181,988	103,048	77,819	25,229

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

1m., Aug.,	'14	$689,028	*$404,450	$284,578	$177,899	$106,679
1 " "	'13	723,529	*410,022	313,507	174,427	139,080
12 " "	'14	8,657,137	*5,060,019	3,597,118	2,105,359	1,491,758
12 " "	'13	8,657,137	*5,060,019	3,533,575	2,045,015	1,488,560

REPUBLIC RAILWAY & LIGHT COMPANY, NEW YORK, N. Y.

1m., Sept.,	'14	$245,879	*$148,779	$97,100	$83,389	$13,710
1 " "	'13	250,962	*152,349	98,613	86,034	12,579
9 " "	'14	2,259,173	*1,348,329	910,844	747,171	163,673
9 " "	'13	2,193,403	*1,374,950	818,453	759,316	59,137

SAVANNAH (GA.) ELECTRIC COMPANY

1m., Aug.,	'14	$71,339	*$46,517	$24,822	$22,933	$1,889
1 " "	'13	70,985	*46,311	24,674	22,800	1,874
12 " "	'14	851,035	*566,663	284,372	274,089	10,283
12 " "	'13	803,661	*558,688	244,873	237,639	7,334

TAMPA (FLA.) ELECTRIC COMPANY

1m., Aug.,	'14	$82,811	*$42,522	$40,289	$4,458	$35,831
1 " "	'13	71,624	*39,665	31,959	4,354	27,605
12 " "	'14	957,024	*522,397	434,626	55,732	378,894
12 " "	'13	796,303	*427,875	368,429	55,126	313,303

*Includes taxes.

Traffic and Transportation

REROUTING CASE DECIDED

Decision by Commission in Important Buffalo Case—Company's Attitude Highly Commended

The public Service Commission of the Second District of New York has rendered its decision in the case which has been pending since October, 1911, regarding the complaint made to it about the rerouting of the Elmwood and the Hoyt Street cars of the International Railway, Buffalo. The commission has denied the petition with reference to the rerouting of the Elmwood line, and has approved a suggestion made by the company about the Hoyt Street cars as a satisfactory adjustment of the principal question. This suggestion in substance provides for a change in the route of the Hoyt Street cars, taking them across Allen Street and Day's Park to Main Street, and thence down Main Street and out Seneca Street to the easterly terminus of that line and returning over Main and Allen Streets, and also rerouting the Grand Street cars by bringing them across Tracy Street from the corner of West Avenue and Carolina Street to South Elmwood Avenue and thence downtown.

The International Railway changed the routes of its Elmwood and Hoyt Street lines in Buffalo, which had, for many years, given crosstown service from the west side of the city to and down Main Street, and thence to the railroad stations; the new routes of said car lines were taken over South Elmwood Avenue, Chippewa and Franklin Streets. This action was the cause of many complaints to the commission from property owners and business men on upper Main Street, who alleged that the changing of the routes worked great damage to upper Main Street interests; counter petitions and remonstrances from the area traversed by such new routes were presented to the commission urging that such new routes be retained. The whole service in Buffalo, and particularly on the so-called west side, was fully discussed, and the conclusion was reached that adequate service for the west side requires crosstown service to and down Main Street of some of the existing lines of cars.

The commission holds that, in the settlement of these questions, the right of the public to adequate, convenient and proper service is paramount to all other considerations; that there is no duty imposed upon either the railway company or the commission so to route the cars of the company that the property values and business conditions along such routes will be preserved or enhanced; that such considerations have no place in the decision which should be arrived at in the case, except as they bear directly upon the convenience and necessity of the traveling public; and that even such convenience and necessity must be controlled in large measure by the ability and facilities of the railway company to satisfy them.

In its syllabus of the case the commission says:

"It is the settled practice of this commission that a street railway has the first right and duty to route its cars in order to satisfy the necessary demands of the traveling public; and if it shall appear to the commission that such routing does not give ample and proper service which the public interests demand, then it is clearly the duty of the commission to change such routes accordingly, giving due consideration, however, to such ability and facilities of the railway company.

"When it appears that the cars of a street railway are carrying substantially all of those who would avail themselves of transportation over its lines in a certain territory, no matter what changes are made in the routes, and it also appears that there would be no substantial increase in income, the commission should hesitate in making an order for a new line of railroad or the increase in the number of cars then in use, which would add considerably to the operating expenses of the company; for it is equally the duty of the commission to conserve the interests of the railway while satisfying the demands of the traveling public."

Referring to the attitude of the company toward the whole proceeding the commission says:

"The attitude of the International Railway throughout

this inquiry, and particularly at the present time, has been most helpful to the commission in its efforts to reach a proper decision in this case; and this is clearly shown by the communication, which was recently received by the commission from the president of the company, by which it appears that, after the lapse of so many years, during which time the chief question in this case has remained unsettled, the company announces its willingness to pave the way for the rerouting of the Hoyt Street cars, by putting the Grant Street cars in their place on South Elmwood Avenue and Franklin Street; all this involves the necessity of widening Tracy Street and building new tracks across that street from Carolina Street to South Elmwood Avenue, which will require the expenditure of about $40,000 by the company.

"The position of the respondent is very fair; indeed, the determination of the company, at the request of many of the interested parties, to make an outlay of so large an amount of money as will be required to reroute the Grant Street cars across Tracy Street, in order to help settle this controversy, is so public spirited that such action should receive more than passing notice from this commission; it should be commended; and the best commendation we can give is to approve of the suggestions made concerning the changes in the routes of the Hoyt Street and Grant Street cars, and use them as the basis for the decision in this case."

I. C. C. ACCIDENT BULLETIN

Accident Bulletin No. 51 of the Interstate Commerce Commission for the three months ended March, 1914, contained the following statement of collisions and derailments on electric railways for the period covered:

No.	Classes	Number	Number of Persons Killed	Number of Persons Injured	Damage to Road and Equipment and Cost of Clearing Wrecks
	Collisions:				
1	Rear	12	2	66	$3,422
2	Butting	3	1	11	2,025
3	Trains separating	..	..	..	.....
4	Miscellaneous	9	..	19	1,895
	Total	24	3	96	$7,342
	Derailments due to—				
5	Defects of roadway	1	..	1	$10
6	Defects of equipment	2	..	10	1,850
7	Negligence of trainmen, signalmen, etc.	1	..	2	150
8	Unforeseen obstruction of track, etc.	1	..	4	150
9	Malicious obstruction of track, etc.	..	..	..	.....
10	Miscellaneous causes	3	..	5	100
	Total	8	..	22	$2,260
	Total collisions and derailments	32	3	118	$9,602
	Total for same quarter of—				
	1913	65	5	383	$48,137
	1912	79	5	402	48,074
	1911	52	1	195	10,173

Inquiry Into Brooklyn Service.—The Public Service Commission for the First District of New York has decided to inquire into the service and equipment of the elevated lines included in the Brooklyn Rapid Transit System. The case will be opened with a hearing on Nov. 9.

Accidents in New York in September.—According to the summary of accidents for September, presented to the Public Service Commission for the First District of New York, it is shown that the number of accidents for the month totaled 6083, in comparison with a total of 6189 for September, 1913. The number of persons injured for the month was 4220, compared with 3995 for the year before; but the number of serious injuries declined from 222 in September, 1913, to 172 in September, 1914. The number killed was thirty for September in each year.

Southern Pacific Transbay Service at San Francisco.—Changes in dispatching via the Eighteenth Street line extension in Oakland, Cal., have made it possible to eliminate a transfer and give faster service between points in Oakland and San Francisco. The change was announced by J. C. McPherson, superintendent of interurban lines, and became effective on Nov. 2. Five trains per hour now run each way between Fourteenth Street and San Francisco boats, the running time to the ferry building in San Francisco now being thirty-five minutes.

Modification of Joplin Near-Side Stop.—The City Commission of Joplin, Mo., has modified the ordinance recently passed which required street cars to stop on the near side of crossings. Under the amendment, Charles Patterson, Commissioner of Public Utilities, may grant permission to stop cars on the far side. There are many waiting stations built by the railways in the outskirts of the city on the far sides of the crossings, and there are some crossings in the business district where boarding or leaving cars on the near side would be inconvenient for passengers.

Passenger Rates Increased in Central States.—In accordance with the decision of the Interstate Commerce Commission handed down last July, the railroads included in the Central Passenger Association will increase their rates effective on Dec. 1. In the future a charge of 2½ cents a mile will be made on interstate fares in the territory north of the Potomac River, east of the Mississippi River and west of Buffalo, Pittsburgh and Wheeling. Heretofore passenger rates have been based on an approximate 2-cents-a-mile basis, with the charge between stations calculated via the short route.

Joint Electric Railway and Steam Excursion.—Officials of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., and the New York, Chicago & St. Louis Railway, reached an agreement recently whereby through tickets were sold from Peru, Ind., and points east of Cleveland on Oct. 24. Tickets were also sold over the Fort Wayne & Northern Indiana Traction Company's line from Bluffton and points north to Cleveland on the same date. This is the first time in the history of the Fort Wayne & Northern Indiana Traction Company that an excursion has been run in conjunction with a steam road. Transfers were issued in Fort Wayne.

Service and Labor Questions in Lexington.—According to the opinion of James G. Denny, city solicitor of Lexington, Ky., if they feel that public safety demands such action the City Commissioners of Lexington have authority to compel the Kentucky Traction & Terminal Company to abandon the "front end only" system of handling passengers and return to the former system of one door at each end of the car. As to the differences between the union employees of the company and the company over the discharge of a motorman, Governor McCreary has named a second arbitrator to adjust the differences. Judge W. B. Smith, Richmond, Ky., who was named by the governor, declined to serve and on behest of both parties Governor McCreary now names Charles C. Bagby, Danville, as umpire.

Chicago & Oak Park Elevated Asks Fare Increase.—In a petition filed by Samuel Insull, receiver for the Chicago & Oak Park Elevated Railroad, Chicago, Ill., in the United States District Court, requesting that he be permitted to issue receiver certificates to pay the cost of elevating the tracks in Oak Park, he also requested the right to increase the fares between Oak Park and Chicago. This move on the part of the receiver is in accordance with the order of the court when it issued a temporary injunction restraining the Illinois Public Utilities Commission from enforcng its order on the elevated railroad to elevate its tracks in Oak Park. In this petition requesting an increase in the fare between Oak Park and Chicago it is stated that the competitors of the elevated line receive a 10-cent fare. It is estimated that if the fare was raised to 8 1/3 cents it would increase the earnings of the railroad $15,000, while if the fare was increased to 10 cents it would increase the earnings $20,000.

New Work Advertised in the Twin Cities.—A. W. Warnock, general passenger agent of the Twin City Rapid Transit Company, Minneapolis, Minn., prepared three full-page advertisements recently for use in the daily papers in Minneapolis and St. Paul. They were headed "Dale Street Car Line to Open," "New Street Car Lines to Open" and "Street Car Lines and Signs." The page headed "Dale Street Car Line to Open" appeared in the St. Paul daily papers. It not only showed the new lines built by the company this year, but reviewed all the work done by the company in St. Paul during 1914, the new lines, the extensions of old lines, the reconstruction of old car lines and new paving.

The page headed "New Street Car Lines to Open" gave the complete story of what the company has done in Minneapolis this year. The page "Street Car Lines and Signs" contained a complete list of all the company's lines, showing the signs carried by the cars and the routes of the cars. This is the first time the company has ever assembled such information about its lines for publication. The typographical arrangement of the pages was excellent.

City of Denver Cautions "Safety First."—The official publication of the city of Denver, Col., recently contained the following statement in regard to the need for care on the streets and the work that the police and the Denver City Tramway are doing in connection with the "safety first" movement: "The most frequently broken of the city's laws are the traffic rules. Therefore the police department has issued orders to all patrolmen and traffic officers to arrest all persons violating any portion of the law. The Denver City Tramway has co-operated with the department of safety along these lines, inasmuch as all employees of the company are required to secure the number of the machine of any offender, report same to the company, which in turn gives it to the police department. The tramway company has issued cards, which are placed in various conspicuous places throughout the city, pointing out the common violations which prove fatal in a great many cases. It may be well for any person owning an automobile or vehicle, if not in possession of a copy of the traffic ordinances of the city, to apply to the city clerk, room 102 City Hall, and secure one." This announcement was accompanied with reproductions of six drawings showing the results of carelessness in driving automobiles.

Monthly Commutation Increase Refused.—Contending that its present monthly commutation rate of $5, applicable to parties or associations of 100 individuals or more, between Napa and Vallejo, is insufficient to pay its proper proportion of expenses, the San Francisco, Napa & Calistoga Railway, Napa, Cal., petitioned the Railroad Commission of California for permission to increase such commutation rate to $6 per month. The commission held as follows: That the method used by the applicant of applying a car-mile basis to all items of expenditure irrespective of the relationship of the expense to the particular trains, the operating expense of which it is desired to determine, permits of such a number of inaccuracies as to make it impossible to reach a conclusion that the increase applied for has been justified; also in view of the fact that the applicant agreed to place in effect such a rate, provided that 125 commuters were secured, and that the Chamber of Commerce of Napa paid the deficit until the required number purchased commutation books, the application is denied without prejudice. Suggestions are made whereby applicant may effect economies by discontinuing a Sunday morning train and consolidating two of its daily trains running under a few-minute headway, without inconveniencing its passengers.

Transfer Decision Affecting Interurban Railways.—In a ruling just announced the Illinois Public Utilities Commission holds that under ordinances requiring interurban railways to give transfers to passengers for use over the city lines and vice versa, the transfer applies only to intra-urban traffic and cannot be applied on travel outside the city. The ruling is in the case of the application of the citizens of Wood River and Benbow City for a reduction of fare over the Alton, Granite City & St. Louis Traction Company's line into Alton. The citizens thought the fare ought to be reduced from 15 cents to 10 cents. The company answered that the fare to the city limits of Alton is now 10 cents and that the additional 5 cents represents the travel over the city lines. The commission fixes the fare at 12 cents from the down-town station, or 10 cents from the city limits, a transfer to be good to the city limits. The company can charge 3 cents a mile when passengers fail to purchase tickets. On the use of the transfer, the commission says: "The commission is of the opinion that all passenger traffic originating outside the city must be considered as interurban business which is not affected by the conditions of the present ordinances granted the respondent by the city of Alton. The commission is also of the opinion that the transfer privileges provided for in those ordinances relate to the intra-urban business only."

Personal Mention

Mr. Logan G. McPherson has resigned as director of the bureau of railway statistics at Washington, which is maintained by the steam railroads.

Mr. M. B. Knapp, formerly with the Republic Railway & Light Company, Youngstown, Ohio, has been appointed superintendent of the Hocking Power Company at Nelsonville, Ohio.

Mr. H. C. Harford has been appointed manager of the employees' stores of the Interborough Rapid Transit Company and the New York (N. Y.) Railways, to succeed Mr. F. H. Gard, resigned.

Mr. W. I. Frost has been appointed superintendent of station service of the New York, New Haven & Hartford Railroad, vice Mr. G. L. Graham, resigned to accept service with another company.

Mr. J. P. Mason has been elected president of the Woodstock & Sycamore Railway, Genoa, Ill., a consolidation of the Woodstock & Sycamore Traction Company and the Chicago, Waukegan & Fox Lake Railway.

Mr. P. E. Ryan has been elected vice-president of the Woodstock & Sycamore Railway, Genoa, Ill., a consolidation of the Woodstock & Sycamore Traction Company and the Chicago, Waukegan & Fox Lake Railway.

Mr. William B. McKinley, president of the Illinois Traction System, Peoria, Ill., who acted as campaign manager for Mr. William Howard Taft in 1912, in the election on Nov. 3 recaptured the seat in Congress which he lost two years ago.

Mr. Lewis W. Henry, who has been acting as right-of-way agent for the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., for the last two years, has been appointed traffic manager of the company to succeed Mr. Charles O. Warfel, now superintendent of the company.

Mr. R. S. Buck, formerly chief engineer of the Dominion Bridge Company, Canada, and previously with the engineering firm of Sanderson & Porter, New York, N. Y., has been appointed engineer of maintenance of way of the New York (N. Y.) Railways, to succeed Mr. W. T. Dougan, resigned.

Mr. A. R. Layman, safety appliance inspector for the State Public Utilities Commission of Illinois, has accepted an appointment with the Interstate Commerce Commission as a railroad inspector. Mr. Layman was appointed to the State Public Utilities Commission in 1909 by Governor Deneen, of Illinois.

Mr. Francis E. Baldwin has resigned as associate and chief assistant counsel of the State Public Utilities Commission of Illinois to become a member of the legal firm of Veeder & Veeder, Chicago. Mr. Baldwin was formerly judge of the County Court of Morgan County, Ill., and resided at Jacksonville.

Mr. Charles O. Warfel has been appointed superintendent of the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., to succeed Mr. Oscar Lively, who has become connected with the Michigan United Traction Company. Mr. Warfel started in as an agent on one of the lines of the company about ten years ago, and advanced to the position of traffic manager, also having charge of the purchasing department.

Mr. Travis H. Whitney was entertained at dinner recently by members of the staff of the Public Service Commission of the First District of New York at the Martinique in honor of his seven years' service as secretary of the commission. The chair was taken by Mr. James Blaine Walker, assistant secretary. Among others present besides Mr. Whitney and Mr. Walker were Chairman McCall, Commissioners Maltbie and Williams, ex-Commissioners McCarroll and Eustis and Judge W. L. Ransom of the City Court.

Mr. Oscar Lively resigned on Oct. 31 as superintendent of the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., to accept a position with the Michigan United Traction Company at Jackson, Mich. Mr. Lively started in the electric traction field as a motorman with the Indianapolis, Shelbyville & Southeastern Traction Company about

eleven years ago. He was later made trainmaster and has been superintendent of the combined lines of the Indianapolis & Cincinnati Traction Company for the last three years.

Mr. H. W. Magruder was elected president of the Kansas Gas, Water, Electric Light & Street Railway Association at the seventeenth annual convention of that body held at Arkansas City, Ark., on Oct. 22, 23 and 24. Mr. Magruder was born in Edina, Mo., in 1880 and was educated in the schools at Pratt, Kan. In early manhood he entered the government railway mail service and later financed the electric plant at Liberal, Kan., and was made president of the new company, the Liberal Light, Ice & Power Company, in which capacity he has since continued.

Mr. William Seibert, superintendent of surface lines of the Brooklyn (N. Y.) Rapid Transit System, has been elected a director of the Coney Island & Brooklyn Railroad, which is now controlled by the Brooklyn Rapid Transit Company. Mr. Seibert is one of the best-known traffic men in the United States. He began his career as a conductor with one of the companies now included in the system of the Brooklyn Rapid Transit Company and has advanced through all of the intermediary transportation department positions to the one which he now holds.

Mr. Theodore P. Shonts, president of the Interborough Rapid Transit Company and the New York (N. Y.) Railways and former president of the Panama Canal Commission, contributed to the magazine supplement of the New York Sunday *Times* for Nov. 1 an article dealing with an elaborate plan suggested by him for the reconstruction of the Port of New York. He favors the plan of having the railroads pool their present properties. This accomplished, he says that the improvement as outlined by him could be carried out at relatively small expense.

Mr. Frederick W. Whitridge, president of the Third Avenue Railway, New York, N. Y., has answered Germany's appeals in a volume entitled "One American's Opinion of the European War." It will be recalled that Mr. Whitridge made a tour of the Continent just previous to the declaration of war and that he was in Scotland at the time hostilities were commenced. His opinion is that Germany is in the wrong and is following false gods. He noted a decided change in the people themselves just previous to the war, from the simplicity and modesty that formerly prevailed among them.

Mr. John P. Coghlan, who has been appointed receiver of the Northern Electric Railway, Chico, Cal., is manager of the claim department of the Pacific Gas & Electric Company, San Francisco, Cal. Mr. Coghlan was for many years a newspaper reporter in San Francisco and occupied his spare time with reading for the bar. Shortly after his admission to practice he was taken into the office of the city attorney of San Francisco under Mr. Percy V. Long and was entrusted with a most important line of work in which he gained distinction. He has been with the Pacific Gas & Electric Company now for several years.

Mr. James F. Hamilton, retiring general manager United Traction Company, Albany, N. Y., was tendered a complimentary dinner on Oct. 29 by the employees of the company, and was presented with a chest of silver as a token of esteem from the men. The presentation was made by Mr. Charles H. Armatage, formerly traffic manager of the company, who was in turn presented with a fur cap and fur gloves to match his other automobile apparel. As previously stated in the ELECTRIC RAILWAY JOURNAL Mr. Hamilton will in the future devote all his time and attention to the Schenectady (N. Y.) Railway.

Mr. William Osgood Morgan has been elected vice-president of the Empire United Railways, Inc., Syracuse, N. Y. Mr. Morgan is a New York attorney, who has been associated with electric railways for the last decade, during most of which time he was vice-president of the Sheboygan Railway & Electric Company, Sheboygan, Wis. For a time he was also an officer of the Greensboro (N. C.) Electric Company. Mr. Morgan has actively participated in the operation of railways, handling finances and legal matters connected with properties which have heretofore been under the management of Mr. Ernest Gonzenbach, now general manager of the Empire United Railways, Inc., and formerly president of the Sheboygan Railway & Electric Company. Mr. Morgan has contributed some interesting articles to the technical press, among them a summary of the Public Utility Law of the State of Wisconsin.

Mr. William T. Dougan has resigned as engineer of maintenance of way of the New York (N. Y.) Railways and in future will engage in the building and construction of business for himself in New York City. Mr. Dougan was graduated from Union College in 1892 and was at once made assistant to the chief engineer on construction of the Fonda, Johnstown & Gloversville Railroad, in which position he continued until he was made chief engineer of construction of the Herkimer, Ilion & Frankfort Electric Railway, now included in the Utica lines of the New York State Railways. In 1897 Mr. Dougan entered the employ of the Metropolitan Street Railway. He was engineer of construction of the underground conduit system until 1906, when he was made engineer of maintenance of way of the company, which has been succeeded by the New York Railways.

OBITUARY

John Kilgour, president of the Cincinnati (Ohio) Street Railway, which is operated by the Cincinnati Traction Company, is dead. Mr. Kilgour was born in Cincinnati in 1834 and was graduated from Burlington College in New Jersey. He entered business with his father in the wholesale grocery house of Kilgour, Taylor & Company, but left that firm to serve under his father with the Little Miami Railroad. Later he and his brother Charles became partners in the wholesale grocery firm of Neave, Brown & Kilgour. Subsequently he and his brother assisted in building the Pendleton & Fifth Street Railroad in Cincinnati. In 1873 the railways in Cincinnati, including the Pendleton line, were consolidated and Mr. Kilgour was elected a director. Nine years later he was elected president of the company. Mr. Kilgour was also interested in telephone development in Ohio and was for many years president of the local telephone company at Cincinnati. In addition he was interested financially in the Toledo, Bowling Green & Southern Traction Company and the Ohio Traction Company. Mr. Kilgour retired from active business about five years ago. Two years ago he resigned as head of the telephone company, but continued as president of the Cincinnati Street Railway up to the time of his death.

Charles O. Kruger, president of the Philadelphia (Pa.) Rapid Transit Company, died suddenly on Nov. 4. Mr. Kruger had apparently been in the best of health. About an hour before his death he left his office with several other representatives of the company to take luncheon at the Racquet Club. While they were walking from the dining room, Mr. Kruger collapsed and died almost instantly. Heart disease was given as the cause of his death. Mr. Kruger was born in Philadelphia on Dec. 14, 1864. His education was secured in the public schools of that city. He decided early to embark in a commercial business and received his first training in the office of S. & W. Welsh, who at that period were leading merchants and foreign bankers. One year later he became secretary of the company which took over all the arc light companies doing business in Philadelphia. He remained in this capacity until 1885, when he was made secretary and treasurer of the Penn Traffic Company, a corporation identified with the Cambria Steel Company. In 1893 he was chosen secretary and treasurer of the People's Traction Company and in 1895 he was made secretary and treasurer of the Union Traction Company, Philadelphia. Three years later he was advanced to the office of second vice-president and assistant general manager, being made vice-president and general manager in 1899. When the Philadelphia Rapid Transit Company, which absorbed the Union Traction Company, was formed in 1902, Mr. Kruger assumed the position of secretary. Subsequently he was elected vice-president and general manager. In 1909 he was advanced to the position of president. Mr. Kruger was a director of the Jenkintown National Bank, Jenkintown, Pa., and of the Northern National Bank, Philadelphia. He was a member of the Union League, Art, Racquet and Manufacturers' clubs of Philadelphia, the Huntingdon Valley Country Club and the Logan Country Club, and was an associate member of the American Electric Railway Association.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Lula-Homer Railroad, Lula, Ga.—Chartered in Georgia to build a 15-mile electric line from Lula to Homer. Connection will be made at Lula with the Southern Railway. Incorporators: S. S. Carter, W. A. Boling, E. E. Chapman and Joel Coffee, Lula.

***Quincy & Hamilton Electric Railway, Hamilton, Ohio.**—Chartered in Ohio to build an electric railway from Quincy to Hamilton. Capital stock, $525,000. Incorporators: Charles S. Carscallon, Charles D. Warner, Edward D. Parkelee, Charles H. Petsch, Warren H. Orr, Earl W. Wood and Robert R. Wallace.

FRANCHISES

***Bisbee, Ariz.**—The Board of Supervisors has been asked to grant a franchise to build an electric railway from Bisbee to Naco.

Los Angeles, Cal.—The Public Utilities Commission has approved the proposed franchise for an extension on Evergreen Avenue, Wabash Avenue, Zonal Street and Marengo Avenue, in Boyle Heights. The Council will call for bids for this franchise.

Clearwater, Fla.—H. A. Murphy and associates have received a franchise to build an electric railway from St. Petersburg to Tarpon Springs.

Methuen, Mass.—The Boston & Northern Street Railway has asked the Council for a franchise for a relocation of tracks in the east section of Methuen.

Southbridge, Mass.—The Worcester Consolidated Street Railway has asked the Council for a franchise to relocate its tracks in Southbridge.

Winnipeg, Man.—The Winnipeg Electric Railway has been instructed by the city to file plans for an extension in the northwest section of Winnipeg.

West Newton, Pa.—The West Penn Traction Company has asked the Council for a year's extension of time on its franchise in which to build an extension between West Newton and Hunker Station.

Montreal, Que.—The Montreal & Southern Counties Railway has received permission from the Council to connect its tracks with the tracks of the Grand Trunk Railway and the tracks of the Montreal Tramways Company in Montreal.

Dallas, Tex.—E. P. Turner, representing the Dallas Southwestern Traction Company, has received a second extension of time on its franchise from the County Commissioners to build the proposed electric line to connect Dallas, Glen Rose, Grand Prairie, Mansfield, Alvarado and Cleburne. The franchise was first extended to Dec. 31, and is now extended to June 30, 1915. [E. R. J., Aug. 29, '14.]

Mexia, Tex.—The Commercial Club has received a franchise to build an electric railway in Mexia.

TRACK AND ROADWAY

Huntsville & Florence Interurban Railway, Huntsville, Ala.—Preliminary arrangements are being made by this company to begin work soon on its line between Huntsville and Florence. Plans have been made for the necessary power, which will be secured from waterfalls in that section. Tracy W. Pratt, Huntsville, is interested.

Pacific Electric Railway, Los Angeles, Cal.—This company has placed in operation the new lines over the extension of Magnolia Avenue, which has been built with a view to its becoming a part of the interurban line ultimately to be built by way of Corona, La Habra and Los Angeles.

San Francisco (Cal.) Municipal Railway.—The Board of Public Works has awarded a contract to the United States Steel Products Company for track special work.

Connecticut Company, New Haven, Conn.—Plans are being made by this company to double track a number of its lines in New Britain.

Rome, Ga.—It is reported that the preliminary survey for the proposed interurban electric railway between Gadsden and Center, Ala., will be made by C. L. March, former city engineer of Gadsden.

Waycross Street & Suburban Railway, Waycross, Ga.—This company has placed in operation its extension to Hebardville.

Springfield, Ill.—The Illinois Public Utilities Commission has approved the issue by the Lee County Central Electric Railway Company of 1010 shares of common capital stock of a par value of $100 per share. The commission has also issued to the company a certificate of convenience and necessity permitting it to extend its present line from Middleburg, Lee County, to Rochelle, Ogle County. [E. R. J., Oct. 24, '14.]

Indianapolis, Ind.—The new Mars Hill line of Indianapolis has been placed in operation, the route of the West Indianapolis line being used to its terminal, thence over special tracks to Minnesota Street and on to Mars Hill, a distance of 2.66 miles from the downtown center of Indianapolis.

LaFayette & Northwestern Railway, LaFayette, Ind.—Offices have been established in LaFayette to direct the construction of this new line, and stakes have been driven to mark out the right-of-way. The railway will run northwestward from LaFayette to Montmorenci, thence north to Remington and Morocco, and thence northwest to Rensselaer, St. Mary's, St. Anne and Kankakee, Ill., where it will connect with the line of the Chicago & Interurban Railway into Chicago. O. L. Brown is the general manager, and he has just appointed Harry Shelhous as chief engineer. [E. R. J., Oct. 17, '14.]

Des Moines (Ia.) Railway.—It is reported that surveys are being made by this company on North Avenue in East Des Moines for a new crosstown line to extend from Waveland Park almost due east to the fair grounds. It will afford direct service between the residence districts of East and West Des Moines.

Covington, Ky.—The South Covington & Cincinnati Street Railway has received a perpetual franchise from the Council in Covington.

Louisville (Ky.) Railway.—Extension of the Market Street line of this company from the end of the track on Frankfort Avenue, out Haldeman Avenue and thence up the Brownsboro road is a possible developments, according to the response of President T. J. Minary, of the company, to a committee representing the Crescent Hill Forward Club.

Boston (Mass.) Elevated Railway.—Plans are being made by this company to extend its line from the present terminus on Playstead Road, West Medford, to Madison Street, on Playstead Road.

Cushing (Okla.) Traction Company.—Contracts have been awarded by this company to build a 13-mile line from Cushing to Drumright. The Cushing Construction Company was estopped from raising the appeal as regards this McAlester, Okla., general manager.

Ottawa & St. Lawrence Electric Railway, Ottawa, Ont.—Work has been begun by this company on the section of its line at Russell. The first division of the railway is to be 119 miles in length and will extend from Ottawa to Morrisburg and on to Beaudette with a branch line from Metcalfe to Russell.

Sudbury-Copper Cliff Suburban Electric Railway, Sudbury, Ont.—Surveys have been made by this company from Sudbury to Copper Cliff, 5 miles; grading has been completed from Sudbury 4.5 miles out, and about 6 miles of track has been laid through paved streets in Sudbury. Construction will be resumed in the spring on this line between Sudbury and Copper Cliff. J. H. Mackey, Sudbury, president. [E. R. J., Oct. 12, '14.]

Toronto Suburban Street Railway, Toronto, Ont.—That this company must build a line on Annette Street from Keele Street to Jane Street in Toronto, is the result of a decision in the Appellate Division at Osgoode Hall on Oct. 22. The company appealed from the order of the Ontario Railway & Municipal Board requiring a single track to be constructed on these streets. The court held that the company was estopped from raising the appeal as regards this

order, but under an agreement between counsel there will be a stated case for the determination of the general question of law as to whether the Railway Board has power to direct the company to build tracks on a street on which, under the company's agreement, dated 1899, the company had an option to build or not.

Toronto, Ont.—Work on the Bloor Street civic line from Dundas Street to Quebec Avenue in Toronto will be begun by the city at an early date. It is stated that special legislation is not necessary.

Uxbridge, Ont.—It is stated that the Provincial Hydro-Electric Commission, in conjunction with the various municipalities, will begin the construction of the following lines this fall: Toronto to Unionville, 14 miles; Unionville to Uxbridge, via Vandorf, 25 miles; Unionville to Brooklyn through Markham; Unionville to Stouffville and Port Perry; also spur line from Vandorf to Newmarket. The cost per mile of the line from Unionville to Uxbridge is estimated at $27,650, including roadbed, buildings, bridges, roadways, etc.

Toronto (Ont.) Railway.—Arrangements have been made by this company and the city of Toronto for the reconstruction of the track on College Street in Toronto from Spadina Avenue to Lansdowne Avenue. The section between Spadina Avenue and Bathurst Street will be built at once.

Glenada, Ore.—The operation of an electric railway from Glenada to the lakes south of the Siuslaw to connect with a steamboat line across the lakes, is a project under way to be financed by Siuslaw capital in the development of extensive plans for this territory. A townsite has already been laid out on the south side of Tsiltcoos Lake. It is proposed to electrify the present narrow-gage tramway constructed by Porter Brothers, railroad contractors, from Glenada south 3 miles to Clear Lake which connects with Tsiltcoos and Long Lake. The railroad contractors will have no further use for the tramway and they have offered the line for a nominal sum to represent the sale value of the material minus the cost of tearing it down and shipping it away. Power is to be obtained, if the project is carried out, from the Florence Electric Company, which has wires already strung across the harbor and which supplies the town of Mapleton with current. [E. R. J., Oct. 17, '14.]

West Penn Traction Company, Pittsburgh, Pa.—Plans are being considered by this company for a line between West Newton and Hunker Station.

Memphis (Tenn.) Street Railway.—This company is asked to consider plans to extend the Crosstown line north from Poplar Avenue and the Overton Park Avenue line out Overton Park Avenue to Evergreen. By extending the Crosstown line the Beale and Main line and the Jackson Avenue line could be tapped in the northeastern part of the city of Memphis.

***Brenham, Tex.**—Plans are being considered to build an electric railway in Brenham and through Washington County. Frank Eberle, secretary of the Brenham Young Men's Business Association, is interested.

Gulf, Freeport & Northern Railway, Freeport, Tex.—This company is asked to consider plans to extend its line through Rosenberg. Beginning at Freeport, the proposed line extends through Columbia, Damon's Mound and Fairchilds, and the surveying lines are now within a few miles of Rosenberg. Grading of some 20 miles from Fairchilds south has already been completed. D. A. Barr, Freeport, is interested. [E. R. J., Oct. 3, '14.]

***Dayton, Tex.**—Plans are being considered to build an electric line between Dayton, Houston, Beaumont and Liberty.

San Antonio, San Jose & Medina Interurban Railway, San Antonio, Tex.—Citizens of Castroville, La Costa, Rio Medina and Red Wing have raised a bonus of about $35,000 to aid in the construction of an interurban line to extend between San Antonio and the Medina dam, via San Jose, Kirk, La Coste, Castroville and other points. It is planned to begin construction of the line between La Coste, 25 miles west of San Antonio, on the Sunset division of the Southern Pacific Railroad, and the Medina dam within the next few weeks. J. G. Miller, 400 Swearingen Building, San Antonio, general manager. [E. R. J., Sept. 26, '14.]

Morgantown (W. Va.) Interstate Railway.—This company has awarded a contract to Joseph Vandergrift, New York, to build an electric line from Morgantown to Point Marion, Pa.

SHOPS AND BUILDINGS

Miami (Fla.) Traction Company.—Plans are being prepared by this company to build new carhouses in Miami.

Bay State Street Railway, Boston, Mass.—The company has opened a new passenger station on School Street in the Washburn Block in Brockton.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.—This company has recently erected an addition to its car shops and offices in North Kansas City at a cost of about $1,000. One of the new stations on the line is that at Camden Point, Mo., about half-way between Kansas City and St. Joseph. The station is of the company's special design, frame and stucco, and is arranged as a residence for the agent. The station also has a little store, to be operated by the agent. The cost of this station was $2,500.

New York Consolidated Railroad, Brooklyn, N. Y.—The Public Service Commission has extended the time within which this company will build a new passenger station upon its Myrtle Avenue elevated line at Cumberland Street and Myrtle Avenue in Brooklyn, from Oct. 1, 1914, to Jan. 31, 1915.

Chambersburg, Greencastle & Waynesboro Railway, Waynesboro, Pa.—Work has been begun by this company on the new addition to its carhouse on East Main Street in Waynesboro. The structure will be 40 ft. x 100 ft. and will be frame, with galvanized roof and sides. It is being built for the purpose of storing the summer cars and will have a capacity for twelve cars.

Ogden (Utah) Rapid Transit Company.—This company has awarded the contract for the new interurban passenger station on Twenty-fourth Street in Ogden to C. F. Dinsmore, Ogden. The contracts for the electric wiring and heating have not been awarded. This terminal will be erected for the joint use of the local company and the Salt Lake & Ogden Railway Company.

West Virginia Traction & Electric Company, Wheeling, W. Va.—This company has received a shipment of material for the construction of a large pumping station to be located at or near Majorsville. Plans are being made to build a new passenger station at Majorsville.

POWER HOUSES AND SUBSTATIONS

South Covington & Cincinnati Street Railway, Covington, Ky.—This company will install new substation equipment consisting of two 1500-kw synchronous rotary converters, six 525-kva transformers, two switchboards and accessories. All the apparatus will be furnished by the General Electric Company.

Interborough Rapid Transit Company, New York, N. Y.—This company will install new substation equipment, comprising two 4000-kw, six-phase commutating pole rotary converters, seven 1400-kva transformers and accessories. The contract to build all the apparatus has been awarded to the General Electric Company.

Nashville Railway & Light Company, Nashville, Tenn.—This company will place in operation in one of its substations a 500-kw motor generator set which was recently purchased from the General Electric Company.

Corpus Christi Railway & Light Company, Corpus Christi, Tex.—This company will add to its substation equipment a 200-kw, three-bearing synchronous motor-generator set of General Electric make with 8.5-kw exciter.

San Antonio Gas & Electric Company, San Antonio, Tex.—This company will place in operation new substation equipment consisting of a 1000-kw, six-phase commutating pole rotary converter, three 350-kva transformers and accessories. This apparatus has been purchased from the General Electric Company.

Monongahela Valley Traction Company, Fairmont, W. Va.—This company will place in operation new power plant equipment comprising three 1250-kw, a.c. generators and 100-kw motor-generator set. The contract for the apparatus has been placed with the General Electric Company.

Manufactures and Supplies

ROLLING STOCK

Chicago, Milwaukee & St. Paul Railway, Chicago, Ill., has ordered one 1500-volt 50-ton electric locomotive from the General Electric Company.

Interborough Rapid Transit Company, New York, N. Y., is having ten work cars built by the Magor Car Company.

Bolivian Rubber & General Enterprise Company, La Paz, Bolivia, a new line in that city, has placed an order for rolling stock with The J. G. Brill Company.

Shore Line Electric Railway, Saybrook, Conn., is expecting to purchase several new interurban cars with seating capacity of not less than fifty-two persons, to replace those recently destroyed by fire.

Wilkes-Barre & Hazleton Railway, Hazleton, Pa., has under consideration the purchase of five interurban cars and ten city cars, as well as six or eight freight cars. These cars will probably be of all-steel construction.

Dallas (Tex.) Consolidated Electric Street Railway has specified the following details for the thirty-five closed prepayment motor cars recently built by the American Car Company:

Seating capacity.....40	Curtain material...Pantasote
Bolster centers, length, 19 ft. 2 in.	Destination signs.....Hunter
	Fare boxes.....Johnson
Length of body....20 ft. 6 in.	Fenders .....H.B.
Length over vestibule, 39 ft. 6 in.	Pinions.....Tool Steel
	Gongs .....Wall Mfg. Co.
Width over sills, 8 ft. 3 13/16 in.	Hand brakes.....Dayton, with Peacock improved drum
Width over all..8 ft. 7 5/16 in.	Heaters .....Consol.
Height, rail to sills...32⅝ in.	Headlights .....Esterline
Height, sill to trolley base, 8 ft. 10⅞ in.	Journal boxes.....Brill
	Motors, 2 G.E. No. 201, outside hung
Body .....composite	Registers .....International
Interior trim....statuary bronze and malleable iron	Sanders...Elec. Ser. Sup. Co.
	Sash fixtures..O. M. Edwards
Roofing .....Agasote	Seats..Hey. Bros. & Wake, reversible
Roof .....arch	
Underframe .....metal	Seating material.....rattan
Air brakes.....West.	Springs .....Brill
Axles .....Brill	Step treads.....American Abrasive Metals Co.
Bumpers .....American	
Cables .....G.E.	Trolley catchers....Keystone
Car trimmings.....Dayton	Trolley base.....G.E.
Control, G.E. type, M.K., double-end	Trucks.....Brill 39 E
	Ventilators .....American
Couplers .....Tomlinson	
Curtain fixtures. Cur. Sup. Co.	

TRADE NOTES

C. M. Paxton has resigned from the Peter Smith Heater Company, Detroit, Mich., to re-enter the operating field.

Nachod Signal Company, Inc., New York, N. Y., has received orders from the Lehigh Valley Transit Company for four automatic signals, Types CD and MD. Part of this equipment will be used for the Eighth Street Bridge in Allentown, Pa., which is one of the notable concrete structures in America.

John A. Roeblings Sons Company, Trenton, N. J., has received a $50,000 order for telephone cable from the New York Municipal Railway which will be used for the first of a progressive series of instalments of the telephone train dispatching system on the new rapid transit lines of this company.

General Electric Company, Schenectady, N. Y., has received orders for electrical equipment from the following electric railways: Boston (Mass.) Elevated Railway, forty MK control equipments; Springfield (Mass.) Street Railway, ten air-brake equipments; Dayton & Troy Electric Railway, Tippecanoe City, Ohio, ten GE-88, 40-hp form B split-frame railway motors; Worcester (Mass.) Consolidated Street Railway, ten air-brake equipments; Cincinnati & Columbus Traction Company, Cincinnati, Ohio, four GE-73, 75-hp railway motors.

General Railway Signal Company, Rochester, N. Y., has appointed M. Wuerpel assistant to president. S. G. Johnson, vice-president, will be in full charge of the sales department (which includes all branch and foreign office, commercial engineering, commercial inspection and contract installation business) reporting to the president and general manager and with headquarters at Rochester. All those in the sales department formerly reporting to the president and general manager will now report to and receive all instructions from Vice-President Johnson. This company has created a department of publicity and education. H. M. Sperry has been appointed as manager of this department, reporting to the president and general manager and co-operating closely with all departments.

ADVERTISING LITERATURE

MacGovern & Company, Inc., New York, has issued a catalog of its used electrical and steam machinery, including cars and car equipment.

Prepayment Car Sales Company, New York, N. Y., has issued a folder entitled "Blunders," which calls attention to the saving from blunders effected by equipping new cars or re-equipping old ones with prepayment platforms.

Lutz-Webster Engineering Company, Inc., Philadelphia, Pa., has issued a folder describing its compression wrenches, drill posts, compression ratchets, double-end sockets, no-set-screw lathe dogs, drill sockets and bridge and extension sockets.

Eugene C. Mills, chief engineer Sacramento Valley Irrigation Company, Willows, Cal., has issued a booklet describing the corrugated iron construction on the Sacramento Valley Irrigation project. American Ingot Iron is used in this construction.

J. D. Este Company, Philadelphia, Pa., has issued a folder illustrating the game of "Skee-Ball," which recently attracted so much attention at the A. E. R. A. convention at Atlantic City. The game may be readily used as a drawing feature for amusement parks reached by electric railways.

Goldschmidt Thermit Company, New York, has issued pamphlet No. 16, second edition, describing and illustrating the thermit process of pipe welding. Pamphlet No. 39, just issued, describes some recent improvements in methods and practice made by this company in its thermit insert fully-welded rail joint.

Fiber Conduit Company, Orangeburg, N. Y., has issued the third edition of its complete fiber conduit catalog. The catalog gives detailed and illustrated descriptions of this company's various types of conduit, including the socket joint, sleeve joint, Harrington joint, screw joint and "Linaduct" types. A number of photographs show several installations of this conduit.

SKF Ball Bearing Company, New York, N. Y., has issued a compact catalog on the SKF ball bearing as applied to electric railway service. Of particular interest is the company's installation of these bearings on the new stepless cars of the Third Avenue Railway, New York, after SKF bearings had made good in four years' service on the same railway's storage-battery cars. The booklet reviews the merits of the ball bearing from many angles, including that of energy and lubrication economies, shorter motor length, better maintenance of armature air gap and improved meshing of gearing.

Swedish Ljungström Steam Turbine Company, Ltd., Finspong, Sweden, has issued its first catalog describing its "Stal" steam turbines of the radial-flow type, especially adapted to the driving of generators. In these turbines the reaction principle has been applied, which is said to result in unusually good steam economy, reliability and saving of space. In elaborating the design of this turbine special attention has been devoted to the effect of hot steam on its components and arrangements have been made so as to avoid any unfavorable influence of varying steam pressure and steam temperature on the adjustment of the different parts. The expansion and contraction of the material may take place without altering either the centering and balancing of revolving parts or the clearance between revolving and stationary parts. Consequently the working safety of the turbine is insured both at high and low temperatures, and this turbine system can therefore be applied in conjunction with the highest steam temperatures and steam pressures that are obtainable with existing types of boilers and superheaters.

BRILL TRUCK PEDESTAL WEAR PLATES

BRILL center pivotal trucks have the inner faces of the pedestals of the solid forged side frames planed to give an accurate fit to the pedestal wear plates, or gibs, which take the wear caused by the vertical movement of the journal boxes. These pedestal wear plates are made of pressed steel with pressed recesses, or sockets, at the bolt holds, avoiding the thin edges of machine counter-sunk holes and obtaining a substantial bearing for the conical bolt heads; corresponding sockets are bored in the pedestals providing a hold to the wear plates without depending on the bolts fitting tight in their holes.

THE J. G. BRILL COMPANY
Philadelphia, Pa.
AMERICAN CAR COMPANY
St. Louis, Mo.
G. C. KUHLMAN CAR CO.
Cleveland, Ohio
WASON MANUFACTURING CO.
Springfield, Mass.
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BRILL

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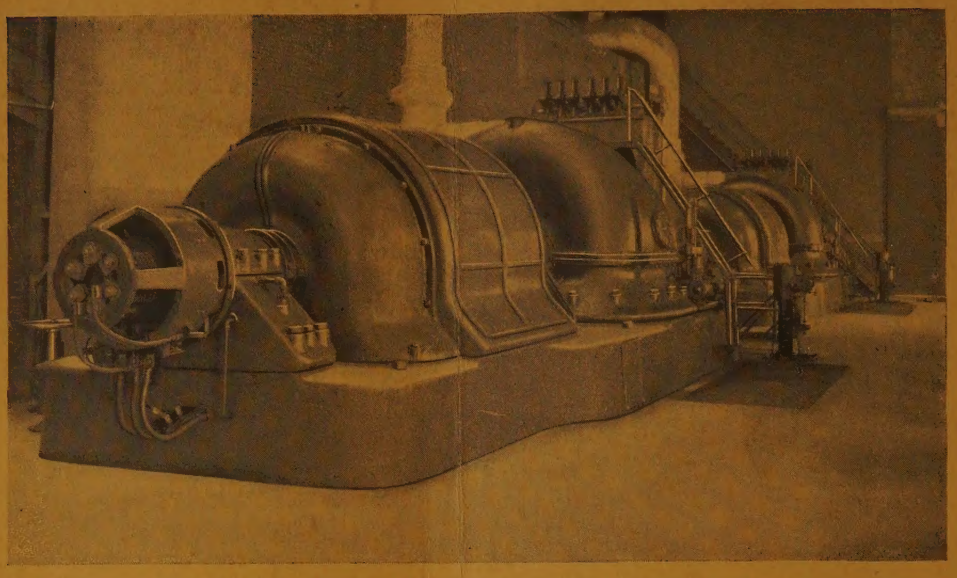
CURTIS TURBINES
CLOSELY LINKED
RELIABILITY ECONOMY



6250 kw. Curtis Steam Turbine, Fort Wayne and Northern Indiana Traction Company, Fort Wayne, Ind.

Seven and One-Half Days from Cars to Bus Bars

That is the installation record of the 6250 kw. turbine shown above. In seven and a half days from its arrival in Fort Wayne, this turbine was ready to carry load.

Such quick installation is not always necessary, but the fact that a comparatively large Curtis turbine can be put in service in so short a time indicates that its mechanical construction does not require delicate adjustments after arrival at destination.

Curtis turbine purchasers are assured that no delay need occur in turning out power after the turbine is delivered.

General Electric Company

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Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Columbus, Ohio
Dayton, Ohio
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Des Moines, Iowa
Detroit, Mich.
(Office of Agent)
Duluth, Minn.
Elmira, N. Y.
Erie, Pa.
Fort Wayne, Ind.
Hartford, Conn.

General Office: Schenectady, N.Y.

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Toledo, Ohio
Washington, D. C.
Youngstown, Ohio

For Texas, Oklahoma and Arizona business refer to Southwest General Electric Company, (formerly Hobson Electric Co.), Dallas, El Paso, Houston and Oklahoma City. For Canadian business refer to Canadian General Electric Company, Ltd., Toronto, Ont.